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MOTOR AGE

VOLUME XXI

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NUMBER 10

McCORD REAL TRUCK RADIATORS

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Cast Tanks
and
Fittings*



*Support
Brackets
Cast Integral
with
Side
Members*

Built to Withstand the Exigencies of Commercial Vehicle Service

McCord Manufacturing Company
Detroit

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STANDARD MODEL

MASTER MODEL

PERFECT SIX MODEL



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No manufacturer in the entire industry, regardless of the number of cars he may build, produces a more complete line or a line of greater intrinsic merit than the LEXINGTON.

The Popular Model—touring car or roadster—at \$1400, is the just-right car for those who want maximum efficiency at minimum cost. This model is a new LEXINGTON creation, and we are justly proud of it.

The Standard Model—touring car or roadster—at \$1775, has for the past two years set the highest standard for automobile value. It is equipped with a specially constructed RUTENBER motor, unit power plant, and such other expensive, high-class features of construction as Timken full-floating axle, Warner transmission, Bosch magneto, self-starter, etc.

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LEXINGTON MOTOR CAR COMPANY

Connersville, Indiana



STANDARD MODEL ROADSTER, \$1775

MOTOR AGE

Boston Largest Show of the Winter



BOSTON, Mass., March 2—New England is having its turn. Tonight, with the opening of the tenth annual motor car show in this metropolis, the six New England states have been once more given their annual opportunity of studying the motor car and its progress for another cycle of time.

Boston always has had the reputation of promoting the greatest retail business show in the country. Unlike New York and Chicago,

BOSTON SHOW DECORATIONS

More Makes of Cars on Exhibition in the Hub this Week Than at Either Chicago or New York—Count Shows 104 Different Makes of Passenger Vehicles for a Grand Total of 363 Machines—All New England in Attendance

the cars are not exhibited by the manufacturers, but by the local dealers and local branches. But notwithstanding this handicap the show which opened tonight is the greatest of the year so far as car exhibitors are concerned. One hundred and four different makes of cars are on exhibition here. These embrace American and foreign gasoline cars, electric cars and steam cars. The only difference in the show this year as compared with former seasons is that the com-



PART OF EXHIBITION HALL, SHOWING CARS AND PART OF THE ACCESSORIES

mercial car is not shown. It has been given the honor of a show of its own, running from March 13-20.

One hundred and four different makes of cars is a record-breaker. Madison Square garden this year had but sixty; the Grand Central palace show but thirty-one, and Chicago with ninety-eight was the only real competitor of Boston. Not only does Boston lead in the number of makes of cars shown, but also in the number of cars in the exhibit spaces, some exhibitors having as many as nine different models displayed besides chassis and working motors. Here are the comparative figures of the big 1912 shows:

Name of show	Different Makes	Total Cars
Madison Square garden.....	60	248
Grand Central palace.....	31	163
Chicago	98	344
Boston	104	363

Boston the Show Leader

These figures show how Boston leads all others. It is questionable if ever before has there been exhibited to the public in America so great an array of cars. It is true, all of the different makers are not represented, but there is a goodly number, and some vehicles are seen here that have not been exhibited at other big shows, in this list being such names as Apperson, Ford and Stanley.

The exhibit of electric machines is not large. Boston is not a strong city for pleasure electric vehicles; in fact, it is one of the slowest in the east in this particular field. In spite of this, however, such electric exhibits are seen as Baker, Babcock, Detroit, Flanders, Waverley, Rauch & Lang and Bailey. The following is a complete list of all cars exhibited:

CARS AT BOSTON

American	Metz
Amplex	Matheson
Apperson	Metallurgique
Abbott	Maxwell
Atlas	Moyer
Auburn	McFarlan
Aaco	Mitchell
Baker electric	Moon
Bailey electric	Marquette
Buick	Marion
Babcock electric	Marmon
Bergdoll	Mercer
Berkshire	Norwalk
Cadillac	National
Case	Nyberg
Cunningham	Oakland
Chalmers	Ohio
Chadwick	Oldsmobile
Cutting	Ohio electric
Cole	Ottomobile
Cartercar	Overland
Columbia	Packard
Detroit electric	Peerless
DeDion	Pierce-Arrow
Everitt	Penn
Elmore	Premier
E-M-F	Pullman
Firestone-Columbus	Paige-Detroit
Fiat	Pope-Hartford
Ford	Rambler
Flanders	Reo
Flanders electric	R & L electric
Franklin	Ryal
Garford	Renault
Great Western	R. C. H.
Hudson	Stearns
Haynes	Stevens-Duryea
Hupmobile	Stanley steamer
Hupp-Yeats	Speedwell
Havers	S-P-A
Imperial	Stoddard
Inter-State	Selden
Jackson	Staver
Kisselkar	S. G. V.
Knox	Stutz
Krit	Thomas
King	Velle
Lozier	White
Locomobile	Winton
Lenox	Warren-Detroit
Lexington	Westcott
Lion	Waverley

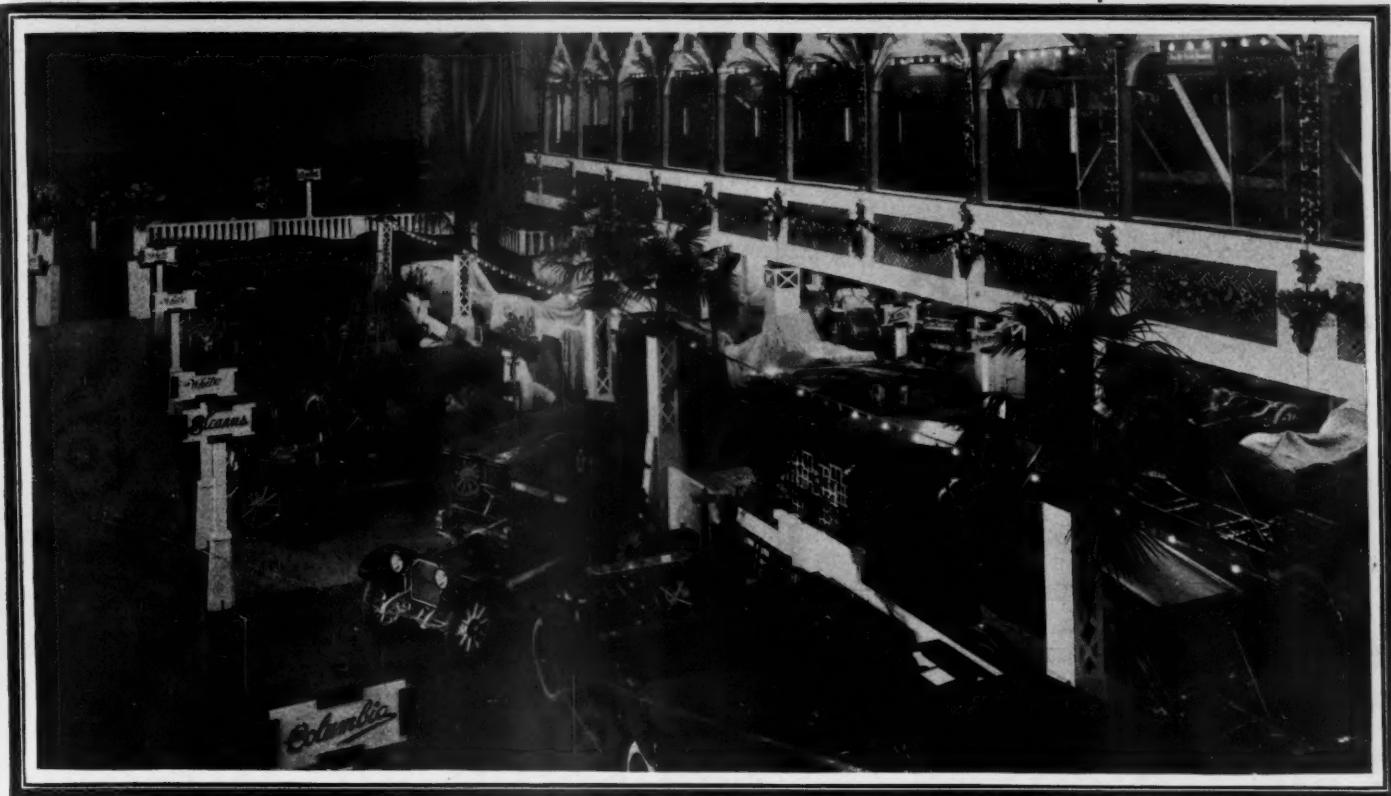
In looking over the gasoline cars exhibited, it would be useless to dwell upon any of them in particular, as this has been amply done in these columns in conjunction with the national shows at New York and Chicago. Suffice it to say that all of the big manufacturers' products are shown in great numbers, from the limou-

sine down to the runabout. Stripped chassis are very general. In many cases the same exhibits that have been doing the national shows have been brought here, so that the New Englander has as good an opportunity of studying the cars as has been given this year.

Tonight's show is all being held in Mechanics' building, which has been made possible by eliminating the commercial vehicles from this show. Mechanics' building is a huge right-angled triangle with three exhibit floors, the main floor, a second floor and a basement. On all three floors a total exhibit space of 105,000 square feet is afforded, this is not including the aisles. The cars are given the entire main floor and, roughly speaking, also occupy over one-half of the basement space. The entire remainder of the floor area is given over to accessories, which are to be found in nearly a dozen different places, in the basement and on the second floor.

How the Show Is Divided

Mechanics' building, while right-angled in shape, is divided into two compartments by a partition cutting off one-third of the base or short end of the triangle. This portion of the building is known as Grand hall, and it is in here that the major effort in the decorative scheme has been made. The other department, which is a triangle, forming the upper two-thirds and apex of the floor plan, is known as Exhibition hall. The division of the basement into two compartments corresponds with that of the main floor and the second floor also harmonizes.



BOSTON SHOW, LOOKING TOWARD STAGE IN EXHIBITION HALL

In the decorative field Grand hall is fashioned along the Spanish garden style. The hall is a rectangular room with a raised stage at one end, and on which are the Packard and Cadillac exhibits occupying the places of honor in the hall. The front of the stage is fenced with massive floral decorations, practically concealing the cars on the stage when viewed from the main floor. At either side of the stage is a small raised platform surrounded by a white fence. On one of these is the Baker electric, and on the other a Rauch & Lang, these two vehicles being the box parties of the show.

Flowers Used for Decorations

A gallery surrounds three sides of Grand hall. The front is a series of arches decked with brilliant colored flowers which are illuminated by miniature electric lights. Palms are used also.

In Exhibition hall the decorative scheme is an English landscape effect with genuine evergreen hedges separating the exhibit spaces. For corner posts at these hedges are miniature rose trees with illuminated blooms. The walls are covered with landscapes. In the basement the lattice work covering for the steel girders is much the same as last year, excepting that more evergreens are used.

Boston is a business show, and although it is impossible to estimate tonight what will be the value of the show for this year, the spirit and feeling among the exhibitors is that it will be a greater exhibition than last year. Invitations have been sent out to 3,000 dealers, agents, garage men and repair men, throughout the six New England states. While few

of these have been in attendance tonight, the invasion is looked for early in the week when each will give his credentials to the management and receive a season pass. Nearly every Boston dealer feels assured that the number of dealers will be considerably greater than last year. Many of these dealers have not only invited all of the agents and sub-agents throughout their territory, but they have circularized the entire car owning population, so that it is safe to say there is scarcely a car owner in New England but who has heard directly regarding the show.

The accessory manufacturers are here in force as formerly, and their end of the show savors of the national in that it is held in conjunction with the Motor and Accessory Manufacturers, so that the majority of the accessory exhibits are made direct by the manufacturers and not by Boston dealers. In round numbers there are 100 exhibitors who are members of this association, and nearly 100 others, many of whom are Boston manufacturers and whose field of operation is confined to New England. There are few accessory exhibitors who sell direct to the manufacturer, but nearly all those present have wares which appeal directly to the dealer, the garage man or the private owner.

Although opening hour tonight was set at 8 o'clock, the different exhibit spaces were filling up rapidly nearly an hour in advance of this, and when the official opening hour arrived, and the show unostentatiously became a reality, the crowds had packed every space in all of

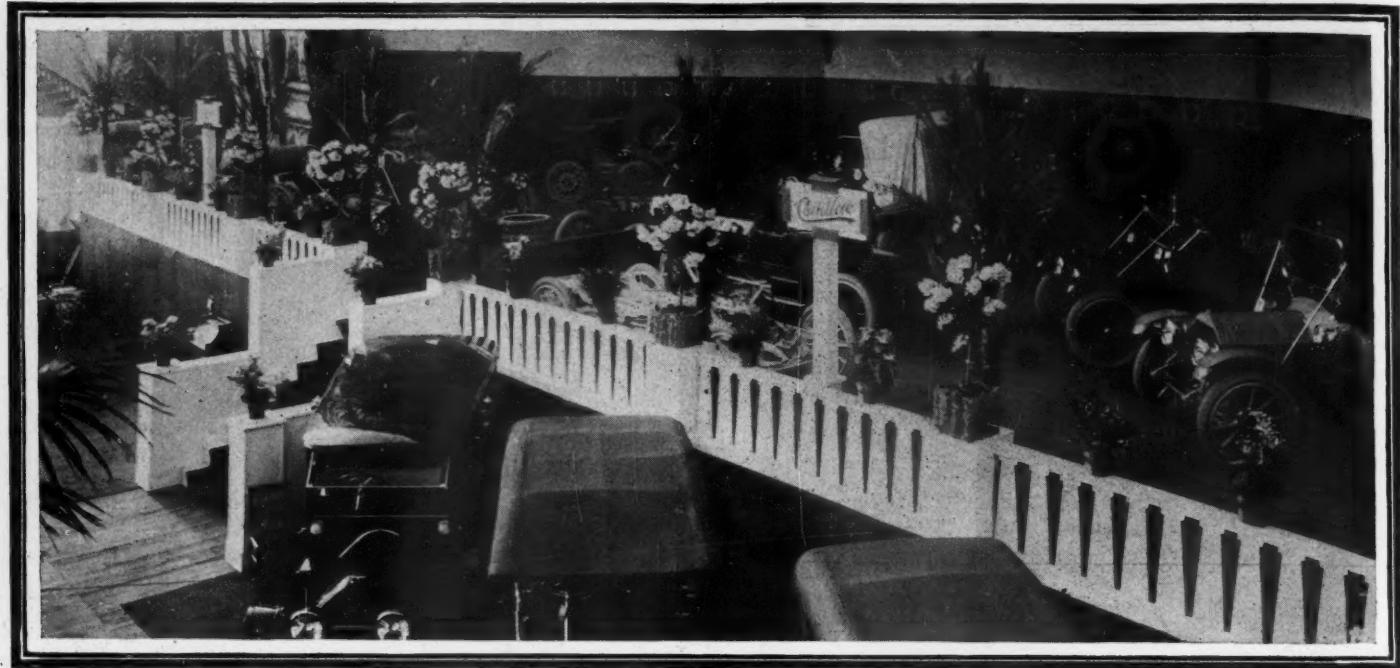
the aisles. Like all first nights it was paper night, meaning that the majority of those attending had been given complimentary tickets, so that definite inferences as to the possible business could not possibly be deduced from the inquiries made this evening. Tonight's attendance was close to 30,000, or over 4,000 greater than opening night a year ago.

Growth of New England Industry

The phenomenal growth of the motor car industry in New England can be well gained by a brief comparison with the first motor car exhibition held in Boston in 1903, when thirty-two cars were exhibited, these representing nine different makes. The value of the exhibits of the first show was placed at \$75,000, whereas the value of the cars and accessories on display tonight exceeds the \$1,000,000 mark. The comparison might be carried another stage by stating that but 20,000 square feet of floor space was utilized at the first show, as compared with more than 105,000 square feet of the present exhibition.

As outlined in Motor Age last week, Boston is the center of one of the greatest car buying territories in the country. It is also the center of one of the greatest good roads systems.

Having all New England from which to draw, the Boston show naturally attracts many prospective purchasers who wait for the Hub exhibition before placing their orders. They realize that Boston gets all the best things shown at New York and Chicago, which gives it an advantage over the national exhibitions.



STAGE IN EXHIBITION HALL AT BOSTON SHOW, HOUSING TWO BIG CONCERN

Talk Overload, Speed and Body Weights

Truck Makers, Brought Together in New York by N. A. A. M., Discuss Matters of Vital Import to Industry—General Form of Guarantee Recommended for Adoption—Prominent Speakers Make Addresses

NEW YORK, March 5—What will go down in history as a most important cornerstone in the motor truck industry in America ended in this city at noon today. It was the 2-day convention of truck manufacturers under the auspices of the National Association of Automobile Manufacturers.

The national organization recently appointed a committee with S. D. Waldon as chairman, assisted by Walter White and B. A. Gramm, to get the commercial manufacturers together to discuss problems of vital interest to the industry. More than half a hundred of the leading truck makers attended the sessions yesterday and today, and all of these have taken a deep interest in the subjects discussed and have participated generally in the discussion. When adjournment was made at noon today to meet again June 4 it was the unanimous opinion that seldom if ever before have manufacturers got together in a more businesslike way, and rarely have such important results followed so short a convention.

Matters of Importance Discussed

One of the most important results of the convention was the consideration of speeds at which different motor trucks and delivery wagons should operate. Of equal importance were such matters as permissible overloads, permissible body weights as compared with carrying capacity of truck, manufacturers guarantee covering

defective materials and also maintenance guarantee.

One of the direct results of the conference was the recommendation to the N. A. A. M. of the overload, speed and body weight. These are covered in an accompanying tabulation covering trucks with a rating from $\frac{1}{2}$ ton to 10 tons.

This tabulation shows that with a 1,000-pound vehicle an overload of 20 per cent or 200 pounds is allowable; that a speed of 16 miles is the maximum average, and

the body weight should be 500 pounds, or 50 per cent of the load. The tabulation shows the overload, speed and body weights for all other sizes. In each case the overload is 20 per cent. The body weight ranges from 50 per cent in a 1,000-pound vehicle to 12 per cent in case of a 10-ton vehicle.

Manufacturers' Guarantee

In the matter of manufacturers' warranty, the following general form was framed by Charles T. Terry, general counsel for the N. A. A. M., and was recommended for adoption.

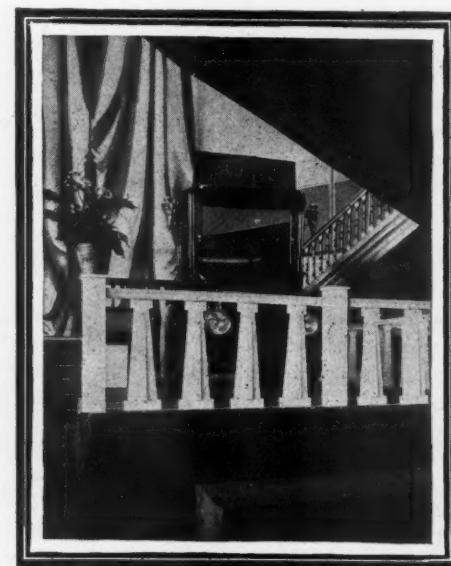
We warrant the new motor trucks manufactured by us for 90 days after date of delivery to purchaser, this warranty being limited to the furnishing, at our own factory, of such part or parts of the motor trucks, as shall, under normal use and service appear to us to be defective in material or workmanship.

This warranty is limited to the shipment to the purchaser without charge, except for transportation, of the part or parts intended to replace the part or parts which, upon their return to us, at our factory, for inspection, we shall have determined were defective, and provided the transportation charges for the part or parts so returned have been prepaid, and provided further that the said failure of the said part or parts is shown not to be due to abnormal use, misuse, neglect or accident, occurring after such motor truck shall have been shipped to the purchaser.

We make no warranty whatever in respect to tires, rims, ignition apparatus, lamps, gas tanks, signalling devices, generators, or other trade accessories, inasmuch as the same are usually warranted separately by their respective manufacturers.

The condition of this warranty is such, that, if the motor truck to which it applies, is altered or repaired outside of our factory, or if it is operated at a speed in excess of its factory rated speed, or if it is loaded beyond its factory rated load capacity, then this warranty shall become null and void and our liability under it shall cease.

At today's session three addresses, with



ONE OF THE ELECTRIC EXHIBITS AT HUB

discussions, occupied the entire session. S. V. Norton, of the B. F. Goodrich Co., read a paper on "Detimental Effects of Overloading and Overspeeding on Solid Rubber Tires." The strong point in his address was that a single instance of overload which exceeded the capacity of resistance of the solid rubber tire worked permanent destruction to the tire. Although this destruction is not immediately apparent, it nevertheless occurs. In speaking on this subject of tires Mr. Norton said in part:

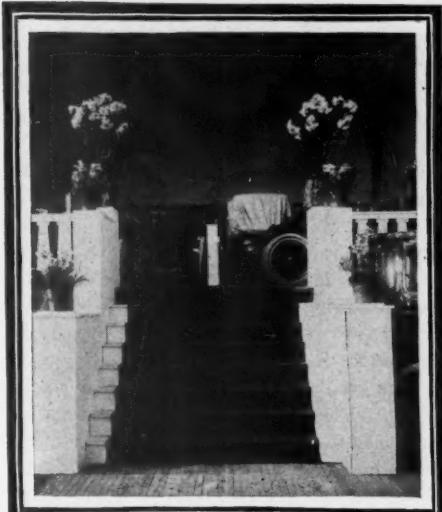
Norton Speaks on Tires

"In the process of manufacture crude gum is mixed with pigments and the whole mass is kneaded together until the compound becomes homogeneous. After various intermediate steps, the rubber is placed in a mold and vulcanized. During vulcanization the tire assumes a more or less permanent form, to which it will normally return if it is not stretched or compressed beyond certain definite limits. If the stretching or compression exceeds these limits, however, the strain will invariably cause a rupture or disintegration of the rubber, not because the average load exceeded the limit of resistance, but because some one load exceeded it, and started the rupture. Tire manufacturers have adopted a schedule of carrying capacities which, with but slight variations, is now considered standard. Let me say, however, that the factor of safety in the schedule is nil. So many other factors enter into the matter, such as excessive strains due to bumps, depressions in the roadway, negotiating grades, overspeeding and the severe use of brakes, that no provision has been made for overload. There are three kinds of overloading to which I should like to call your attention while I have this good opportunity.

Overloading Truck Tires

"The first kind of overloading is due to undersized original tire equipment. I fully realize that the competition in your business make sit necessary for you to economize wherever possible in the equipment of your trucks. You build the best machines that money and skill can devise, and you offer them for sale fully guaranteed—except for tires. Without knowing the danger you are running, you may perhaps equip them with the smallest tires that will come within our schedule of carrying capacities. Then, if for any of the reasons I shall mention later, the tires fail to deliver the service expected, the responsibility is at once automatically shifted to the tire maker's shoulders, and he is expected to live up to his reputation for liberally taking care of his product. The second kind of overloading is due to disproportioned equipment. Sometimes we find trucks whose tire equipment, regarded as a whole, is ample for the service required, will be lacking in carrying capacity at one end, while at the other end there may be an

excess capacity over the actual demands. I have in mind a case in which we were called upon to make an adjustment. The proportion of weight carried by each axle showed that the front tires were considerably overloaded while those on the rear had an excess capacity of nearly a ton. The third overload, which is at once the most prevalent, the most illusive and the hardest to cope with, is due to the improper loading of the commodity upon the truck. Some times this may be the result of faulty distribution of the load over the front and rear axles, which may cause the failure of the tires wholly without the knowledge of the owner. By far the most difficult phase for the tire maker to overcome, however, is the deliberate placing on the truck as a whole too heavy loads for the tires to carry. The way is paved for the abuse even before your



LEADING TO BOSTON SHOW STAGE

OVERLOAD, SPEED AND BODY WEIGHT RECOMMENDATIONS TO N. A. A. M.

Tons	Pounds	20% Overload, Pounds	Miles Per Hour	Weight Std. Body	Weight Ld. Std. Body, Pounds	Total Weight Ld. & Body Overload, Pounds
1 $\frac{1}{2}$	1,000	200	16	500	1,500	1,700
1	2,000	400	15	600	2,600	3,000
1 $\frac{1}{4}$	3,000	600	14	700	3,700	4,300
2	4,000	800	13	800	4,800	5,600
2 $\frac{1}{2}$	5,000	1,000	12	900	5,900	6,900
3	6,000	1,200	11	1,000	7,000	8,200
3 $\frac{1}{4}$	7,000	1,400	10 $\frac{1}{2}$	1,100	8,100	9,500
4	8,000	1,600	10	1,200	9,200	10,800
4 $\frac{1}{4}$	9,000	1,800	9 $\frac{1}{2}$	1,300	10,300	12,100
5	10,000	2,000	9	1,400	11,400	13,400
6	12,000	2,400	8	1,600	13,600	16,000
7	14,000	2,800	7	1,800	15,800	18,600
8	16,000	3,200	6	2,000	18,000	21,200
9	18,000	3,600	5 $\frac{1}{2}$	2,200	20,200	23,800
10	20,000	4,000	5	2,400	22,400	26,400



GIVING AN IDEA OF CEILING IN EXHIBITION HALL AT BOSTON

prospect has bought a truck. I refer to the temptation to which some of your salesmen yield to carry heavier and bigger loads than they should, when they give demonstrations before a prospective purchaser."

W. P. Kennedy, of the Alco company, spoke on maintenance guarantees, one of the most pertinent subjects that has arisen in the development of transportation. He stated in prefatory remarks that he did not believe that definite guarantees should be made as to performance and maintenance, but stated that there was a pronounced tendency on the part of some makers to favor guarantees of certain unknown quantities. Mr. Kennedy took up the analysis of truck service and treated it in exhaustive fashion. He classified the various parts of the motor car into divisions limited by the fact that they do or do not wear in service.

W. P. Kennedy's Views

He said that if a maker of a truck is to stand sponsor for its service in the hands of the user he should have control of numerous elements that are now allowed to hang loose. In the first place, he should be able to say exactly what specifications should be called for in the truck that was to be used in attaining certain results. He also should have the deciding word as to the number of trucks to be used on certain work and not only as far as the number of working trucks on a particular job is concerned, but also the number to be held in reserve. He said that the manufacturer should have veto power as to the employment of drivers and should have an authoritative word as to the garage superintendent and the traffic management.

In estimating the cost of operation of vehicles, it is best to consider the subject under four heads, namely, fixed charges, maintenance, garaging and operation.

Fixed Charges—These should include the interest on investment in vehicles and equipment and depreciation on the non-wearing parts of the chassis such as frame, axles, steering gears, springs, etc., at a figure which will provide a sinking fund for their repurchase when they become useless from a service viewpoint or obsolete. Actual practice in the use of vehicles in New York shows them in good serviceable condition today after the machines have been in use over 10 years, and for this reason depreciation at 10 per cent a year is fair.

Maintenance—Under the head of maintenance comes the upkeep of tires, batteries and mechanical wearing parts of the machine. This should include not only battery material, new tires and new wearing parts for the car required under normal service, but the charges for mechanical labor necessary in making these replacements.

Garaging—Garaging should cover garage labor due to storage, washing and the incidental attention which the vehicle needs in service, and also rent, light, heat, water, etc., as well as fire insurance, etc.

Operation—Operation covers such expenses as are incurred in performing delivery duty, as drivers and helpers' wages, accident and liability insurance, charges for loss and damage to goods during delivery, cost of additional delivery service in cases of exigencies, as well as licenses, etc.

David Beecroft addressed the truck convention on civic problems which act as impediments to the present day introduction of commercial vehicles in the city of Chicago. Coupled with citations of

these impediments, there were suggestions as to how these might be removed by the co-operation of the truck manufacturers and truck dealers with civic organizations and the police.

Chicago Coal Delivery

In speaking of the problems in conjunction with coal delivery in the city of Chicago, M. E. Robinson, vice-president of the City Fuel Co., of that city, was quoted as follows: "When downtown buildings in Chicago are fitted with proper receiving facilities for coal delivery from dumping bodies, the coal dealers will adopt motor trucks exclusively. The motor truck is impractical for house-to-house delivery at present, but there is a big field in the loop district where dumping doors are properly fitted in alleys and sidewalks where dumping wagons can be used."

The speaker went on to show how upon investigation of the coal situation in Chicago it was discovered that more time is lost in the coal-loading yards in motor truck service than often in the delivery fields. Coal-loading yards are entirely under the control of the coal dealers, and yet they have failed to install apparatus there to make motor trucks a success. The reason advanced is that the loading apparatus and loading facilities are adequate for the horse, but entirely inadequate for motor vehicles.

Eighty thousand tons of coal are delivered annually to the public schools of Chicago, yet a dumping body cannot be used in any of this work because the coal has to be unloaded into bins, the tops of which are 5 feet or more above the level of the ground. All of the coal must be shoveled off and the cost of this shoveling alone amounts to \$8,000 per year. Another impediment to the quick introduction of motor vehicles for coal delivery to the schools is that all of the schools are not fitted with 22-foot scales on which the load can be weighed, making it necessary to go to a particular school with a truck to weigh the load and then deliver to another school. Economy of delivery cannot be

had with such facilities as these that have been mentioned.

The relative speed of coal delivery by a motor truck as compared with horse delivery, when modern unloading facilities are offered, is shown in the following statistics of actual unloading at the Karpen building, Chicago. With a 5-ton motor truck, it required but 14 minutes from reaching the building until unloading was complete and the truck started again for the yards. With a horse vehicle, handling the same load, 37 minutes were required. This showed a saving of 23 minutes in unloading, which time was equivalent to 4 truck miles of service.

Receiving Clerk Needed

A great impediment to the successful operation of light commercial vehicles to office buildings in Chicago, is the lack of adequate receiving and shipping facilities at such buildings. At the Heyworth building, a nineteen-story office structure, actual figures on loss of time were taken. It required an express company motor vehicle 7 minutes to get from the entrance of the alley to the small unloading platform of the building, and 35 minutes at this platform to deliver three small packages to one office in the building. This loss of time was due to the expressman having to waste time going up the elevator to the office, returning again to the wagon for the packages, making delivery, and getting the necessary receipts. During this time other vehicles were waiting to reach the loading platform. During each afternoon from 3 o'clock on, over half a dozen express wagons called at the building and some of them do not get away until 6 o'clock. These long waits could be eliminated by a shipping clerk for the building, who would have all packages in his office at a definite time, so that the express wagons could operate on schedule. In such buildings mails are delivered by chute to a common collecting box on the ground floor, and by systematizing the collection of express packages through such a building an amazing amount of time and money could be saved. The following attended:

United States Motor Co.; Alfred Reeves; Everitt Motor Car Co.; William E. Metzger; Motor Age; David Beecroft; B. F. Goodrich Co.; S. V. Norton; Walter Motor Truck Co.; C. W. Fletcher; International Motor Co.; G. H. Hodges; Autocar Co.; David S. Ludum; Hudson Motor Car Co.; Howard H. Coffin and R. D. Chapin; General Industrial and Mfg. Co.; C. H. Wallerich; Alden Sampson Mfg. Co.; M. Grabowsky; American Locomotive Co.; H. F. Flowers and William P. Kennedy; Baker Motor Vehicle Co.; Peter Dumont; Chase Motor Truck Co.; A. M. Chase; Federal Motor Truck Co.; M. T. Pulcher; General Motors Truck Co.; H. S. Stebbins; General Vehicle Co.; F. Nelson Carle and E. W. Curtis, Jr.; Gramm Motor Truck Co.; B. A. Gramm; P. K. Hexter and C. E. Stone; Knickerbocker Motor Truck Mfg. Co.; F. F. Lewis and Herbert G. Street; Knox Auto Co.; E. O. Sutton; Lansden Co.; A. J. Doty; Lauth-Juergens Motor Car Co.; H. S. Diller; Locomobile Co. of America; A. W. Robinson; Mais Motor Truck Co.; Will H. Brown; Metzger Motor Car Co.; W. E. Metzger; Packard Motor Car Co.; J. T. Langhorne and S. D. Waldon; Peerless Motor Car Co.; F. I. Harding; Pierce-Arrow Motor Car Co.; Charles Clifton and H. Kerr Thomas; Pope Mfg. Co.; Albert L. Pope and W. C. Walker; Speedwell Motor Car Co.; G. J. Loomis; U. S. Motors Co.; Benjamin Briscoe; White Co.; Walter C. White.

Approved by N.A.A.M.

New York, March 6—Special telegram—At this morning's conference the National Association of Automobile Manufacturers devoted practically its entire attention to passing on the recommendations received from the truck committee on its 2-day session covering load rating, overloading, body weight and speeds. All of these were ratified by the National association with the exception of the 90-day manufacturers' warranty clause which has been held over for a month pending some legal aspects of the case. The association also ratified some of the Society of Automobile Engineers' standardization measurements for motor truck wheels and tires. This morning's session was exclusively a business one.

Allied Forces Plead for Lincoln Road

WASHINGTON, D. C., March 5—Special telegram—The congressional committee on the library today gave a hearing on the Borland bill, empowering the Lincoln memorial commission to plan and design a national highway from Washington to Gettysburg. Strong pleas in favor of building the road were made by many prominent men. The American Automobile Association was represented by President R. P. Hooper, George C. Diehl and A. G. Batchelder.

General John R. Black told the committee it was the dream of the members of the Grand Army of the Republic to see a highway extending from Gettysburg to Richmond and passing through the national capital. "At our annual encampment we have unanimously endorsed the proposition to have the proposed Lincoln memorial take the form of a great boulevard from Washington to Gettysburg, and if it is built, it will be only a question of time before it is extended to Richmond, binding the north and south," declared General Black.

J. H. Halston, counsel for the American Federation of Labor, said that organization favored the highway as against a Greek temple in Potomac park.

Congressman Fred C. Talbott of Maryland declared no more fitting memorial could be erected than a great boulevard linking Washington with Gettysburg. Congressman Borland of Missouri, author of the measure, informed the committee the highway proposition had also been endorsed by the State Grange of Pennsylvania, representing 70,000 farmers, and by the American Automobile Association.

Replying to the statement that had been made to the effect that the cost of the proposed highway would be \$35,000,000 and that it would cost \$3,000,000 annually to keep it in repair, George C. Diehl declared the statement to be wildly extravagant and not based on facts and figures.

"I have carefully gone into the subject of the cost of construction," said Mr. Diehl, "and I estimate the cost of a 40-foot road, with a 24-foot strip of macadam, treated with a bituminous binder, at \$20,000 a mile. This would make the cost of the 72-mile stretch about \$1,500,000, and the cost of maintenance would be \$750 a mile, including the renewal of the surface of the road every ten years."

The committee will not make its decision for some weeks.

SLIGHT REACTION IN RUBBER

New York, March 5—Following the London rubber auction last week when 850 tons of crude rubber, mostly plantation stock, was sold under the hammer at steady prices, the market has reacted slightly and stands about ½ penny lower

Congressional Committee Considers the Memorial Highway Scheme—Late Trade News

on the basis of up-river Para. Short selling in the market, along the same general lines noted previously has been quite apparent. There is no London auction scheduled for this week and aside from the manipulation the news affecting the market is moderately bullish aside from the selling operations.

Spot cotton is 5 points lower on the general average in the New York market and trade is dull. Heavy purchases by manufacturers who make fabric for motor tires were made last month and for the moment these elements are absent from the market.

INTERNATIONAL ABSORBS HEWITT

New York, March 5—Absorption of the Hewitt Motor Truck Co. by the International Motor Co. has been announced under date of March 1. The sales and executive departments were amalgamated with the International on that date. The company will continue to operate the Mack plant at Allentown, Pa.; the Saurer factory at Plainfield N. J., as well as the New York factory of the Hewitt concern. The line of trucks thus provided extends from wagons of 1,500 pounds capacity to 10 tons. The acquisition of the Hewitt completes the line of heavy-duty trucks produced by this company.

Rumors of a merger of the Lansden factory with the International Motor Co. have been quiet since the Hewitt announcement and no confirmation of them could be secured from the general offices of the company.

ALLIANCE GETS TIRE PLANT

Alliance, O., March 5—The board of trade announced today that it had procured for this city the plant of the Dabies Mfg. Co., of Detroit. The company makes airless tires and is incorporated for \$150,000.

WILL MAKE THE WASHINGTON

Washington, D. C., March 2—The Washington Motor Car Corporation has been formed to take over the assets of the Carter Motor Car Corporation, which recently went into the hands of receivers. The new concern will manufacture a line of four and six-cylinder pleasure cars bearing the name of Washington. It is expected the concern will be incorporated within the next few days. The company is planning to bring out a new model at a popular price. Twenty-nine business men of this city and Hyattsville, Md., where the factory is located, will comprise the directorate, among them being Louis S. Kann, Hugh F. Harvey,

C. C. Gove, W. D. Barry, W. L. Bowles, Dr. John R. Sharp, Dr. H. M. Dixon, Dr. Guy Latimer, Dr. Thomas E. Latimer, J. F. Lillard, J. D. Darnall, W. P. Magruder, Thomas F. Murray, P. M. Galvin, M. H. Herriman, Samuel Gassenheimer and W. K. Hill.

BAILEY AN ABBOTT CHIEF

Detroit, Mich., March 4—Clayton E. Bailey, of Jamestown, N. Y., has been elected first vice-president and chairman of the board of directors of the Abbott Motor Co. This action was taken in part because of the illness of President C. W. Jamieson, of Warren, Pa. He is recovering, but it will be some time before he will be able to resume the active management of the company. Mr. Bailey has acquired a heavy financial interest in the Abbott company. Hereafter the management of the Abbott company will be in the hands of an executive committee composed of N. J. Hammers, general manager, who will act as chairman; B. C. Spitzley, assistant general manager; W. T. Bush, sales manager, and Mr. Bailey, ex-officio.

LOUISVILLE PROSPECTS EXCELLENT

Louisville, Ky., March 5—Under conditions that give promise of a splendid business show, the fifth annual exhibition of the Louisville Automobile Dealers Association begins tomorrow evening and will continue until Saturday night. There will be assembled approximately 200 cars. To date forty exhibitors have secured space. They will show thirty different makes of pleasure cars, seven of electrics, ten of commercial vehicles, several kinds of tires, and motor supplies and accessories galore.

HOOSIER S. A. E. ELECTS OFFICERS

Indianapolis, Ind., March 2—A permanent organization of the Indiana branch of the Society of Automobile Engineers was completed at a meeting held in the rooms of the Hoosier Motor Club in the Claypool hotel on Thursday evening. Permanent officers were elected as follows: Chairman, W. G. Wall, National Motor Vehicle Co.; vice-chairman, C. S. Ricker; secretary, Charles S. Crawford, Cole Motor Car Co.; treasurer, George A. Weidley, Premier Motor Mfg. Co.

ST. LOUIS AGAINST NOISE

St. Louis, Mo., March 4—The mayor has signed the Fletcher ordinance, which is designed to check the unnecessary noises from which the city long has suffered. The ordinance forbids the use of the muffler cutout, and requires that users of motor horns shall sound only an abrupt signal sufficiently loud to be heard above the noise of traffic, and that such signal shall not be sounded save as a warning of danger.



Noise Is Expensive in Motordom

A FEW years ago when the car maker wanted more power he put in a bigger motor, increased the bore and increased the stroke. Within the last 2 years companies have increased the rating of their motors as high as 16 and even 20 per cent, but have not increased either the bore or stroke. You ask what they have done to get more power and they say increased valves, better workmanship, higher speed, etc. Some have enclosed the parts to keep out dust and so keep the parts in the proper condition for a much longer time than if they were exposed to dust and grime.

* * *

IN the field of man it used to be the individual of brute strength who was supreme. The man who could wield the heaviest weapon, carry the strongest arm and smite the hardest stroke was the victor. Today the greatest warrior may be a man of small stature—small in physical bulk, but perhaps a mental giant. Today the business man looking for help does not insist on a 250-pounder, the man of 140 may meet his requirements. Ability is not measured by weight.

* * *

WE are today on the threshold of a new epoch in efficiency, namely silence. The business man who wants to get the best service out of his staff furnishes them with offices well lighted, well ventilated, well arranged, but also quiet. Quietness is becoming a pre-requisite. Noises distract individual effort; they reduce individual economy, in a word they are expensive. No scientist has as yet accurately estimated the percentage in loss in efficiency due to disturbing noises made up of different sounds of given numbers of vibrations per second, but the efficiency expert is demanding this today. Business demands it and it will come.

* * *

BUT while we may eliminate the noise in the office why leave the streets bedlam. There are streets in Chicago, New York, Boston and Philadelphia today where the noise is so great that ordinary conversations cannot be carried on between pedestrians. If they must talk they have to pitch their voices to the abnormal—this consumes nervous as well as physical energy and is expensive. This noise is not confined to the street: Wherever an office window is opened it enters, disconcerting the office force, destroying the desired quiet and cutting down the staff efficiency.

* * *

IN some cities the motor car is responsible for part of the noise and needlessly so. Where the abuse of the muffler cutout is permitted it invariably results in the grand-stand driver disturbing the quiet of residential streets, disturbing hotel guests, disturbing business meetings, etc. There is not any necessity for this. It should be stopped. The motor car is a modern invention, it carries a million benefits to the business man and why place one blot on this record by the foolish abuse of the cutout. The cutout is good in its place. It is excellent for momentary use to discover if the cylinders are all firing, a momentary use as a signal at a corner may be valuable, but its deafening abuse along residential streets, and through country villages is inexcusable. The cut-out should not be eliminated; it is not necessary that it should be; but it is necessary that the motorist should use discretion. There is a time and a place for everything.

CHICAGO as a city has taken an exemplary stand in the suppression of needless motor noises. Recently a motor cutout ordinance was passed prohibiting the use of the cutout after 9 o'clock in the evening and until daylight the next morning. This ordinance resulted from the constant use of the cutout by chauffeurs, joy riders and grand-stand owner drivers, who abused it in residential sections, in the vicinity of hospitals and churches and also at taxi stands before hotels, clubs and theatres. The new ordinance permits the momentary use to test the firing of the cylinders.

* * *

BUT Chicago has gone one step further in anti-noise crusade, namely in the rational use of signals. The drivers who abused the cutout often abused the loud signal, and the civic bodies rebelled. An ordinance was put through stipulating the proper use of signals, and so satisfactory has this ordinance proven that already St. Louis and Omaha have adopted it. It is known as the same signal ordinance as will be adopted in other cities.

* * *

LONDON as a city has set the pace in reducing noise. Scotland Yard, the police headquarters of the city, rules with an iron hand, but a rule which is for the benefit of the city, a rule which is an economic investment to the city. A few years ago the hundreds of motor buses were too noisy. The police took the matter in hand and insisted on the use of silent chain gearboxes, which gave quiet operation. Worm drive was also introduced in many ways. The result is that these huge buses are practically as quiet as an electric pleasure vehicle. While the police were quieting motor traffic they were also getting results along the many other lines of possibilities.

* * *

MOTOR car manufacturers are vitally interested in noise reduction, and by co-operating with city authorities in the suppression of needless noises will establish new confidences with the law-making bodies. Cars of 1912 are immeasurably more quiet than those of a few years ago. The reduction of noise is being followed in every factory. This work accomplishes a double result. While reducing noise by the introduction of new principles and better design and workmanship, the life of the car is being increased, its maintenance is being reduced and also the efficiency of the people in the cities, where the cars are in use, is being increased. All of these are worthy objects. Every maker wants to build his car better, and every person with the good of his country at heart wants to do his part to pushing things along towards the point of higher efficiency. There is a burden on every car maker in this anti-noise crusade—he should take it up with the twentieth-century spirit, he should use his influence in so far as he can in his own business and he should also exercise his influence along lines which will directly benefit the public.

* * *

NOISE is expensive and it is an opportune time for motordom to contribute its share to the world's quietness. A silent-running motor, a conservative use of warning signals inside the city and the cut-out left closed will make the motor car far more popular than it is today. The contrast with the trolley, with its rumble and clanging bell, will remove some of the prejudice that exists in certain quarters.

Scarcity of Freight Cars Trade Menace

DETROIT, Mich., March 4—So serious has been the shipping situation the past week, owing to the shortage of cars and the inability of the railroads to move them that some of the local factories have been on the point of closing down. Nearly all the manufacturers are behind in their shipments and complaints are pouring in by the wholesale from agencies all over the country.

Extreme measures have been resorted to in some instances to get shipments out. The R. C. H. Corporation, on Saturday, shipped eight carloads of R. C. H. gasoline cars and Hupp-Yeats electrics by express to Philadelphia, New York, Boston, Chicago, Cleveland, Minneapolis, Milwaukee and Indianapolis, and, if necessary, will make further shipments by the same means, the dealers in the various cities having expressed a willingness to pay the extra transportation charges in order to get the cars. Saturday's shipment probably was one of the largest ever made by express and the extra charges were something enormous.

After clamoring in vain for fifty cars wanted for immediate delivery, the Roberts-Toledo Automobile Co., agent for the Ford in Toledo, sent forty men to Detroit last Friday with instructions to bring back that many cars. The Ford Motor Co. supplied ten more men from its factory and the fifty headed for Toledo over the icy roads, each driving a brand new model T. The destination was reached in about 3 hours, in spite of the hard going, and the fifty drivers were rewarded with a big dinner and liberal bonuses.

In spite of the freight car shortage, the Ford company reached its high-water mark for 1912 shipments Friday, putting out a total of 300 machines. The same number was shipped Saturday. Each of these shipments was fifty cars above the average needed to make up the total estimated output of 75,000 cars in 1912.

N. A. Hawkins, commercial manager of the Ford, returned Saturday from a 2 weeks' trip down east and brought orders for 3,200 cars for immediate delivery.

The Chalmers Motor Co. is shipping about twenty-five cars per day. The normal output is thirty-five cars, but the railroads are responsible for the discrepancy.

"We are not getting out more than six or seven carloads a day and have been obliged to allow some of the departments to stand idle," said the traffic manager of the Packard Motor Car Co., speaking of the situation.

The Hupp Motor Car Co. began Saturday to move to its new plant at Mt. Elliott and Milwaukee avenues and the men who quit work in the old plant on Jefferson avenue, Saturday noon, re-

Detroit Makers Hampered by Lack of Shipping Facilities—Express Used by Some

ported for duty at the new one this morning. Factory Superintendent Clarence A. Hillis superintended the transfer, which was accomplished with the aid of twelve 3-ton motor trucks and a force of 100 men, working in day and night shifts. The company's new executive offices are not yet ready for occupancy and probably will not be until April 1. In the meantime the business of the company will be directed from the old quarters on Jefferson avenue.

Lee Counselman, vice-president and general manager of the Chalmers Motor Co., is authority for the statement that his company has already sold practically 70 per cent of its output for 1912, and on this fact he predicates the statement that all the company sales records will be broken this year.

"Our Detroit business has been running far ahead of anything we have done previously, and orders received daily at the factory show that the same condition exists in all parts of the country," said Mr. Counselman. "Our anxiety now is to give our dealers sufficient cars to supply the demand. The San Francisco dealers recently ordered 165 cars. New

York city is asking for cars at the rate of about 100 per week. Just a few days ago Portland, Ore., ordered 110 cars. The day before, Philadelphia ordered seventy and the day following Omaha sent specifications for fifteen and Sioux City for twenty-one. On one day during the past week Boston ordered forty-nine cars, Newark twelve, Philadelphia twelve, Minneapolis eighteen and Dallas, Tex., thirty-eight. During the past 15 days, the average number of orders for immediate shipment has been forty-eight."

QUESTIONS CANADIAN CAR COUNT

Winnipeg, March 2—The recent article in Motor Age regarding the position of the motor industry in the dominion of Canada, has caused considerable comment in the western provinces, where the statements in regard to the number of cars in use in the different cities and towns are considered entirely out of place and only made by someone not familiar with the subject.

Montreal is given the second place in the list of cities for the number of cars owned with a total of only 550. Winnipeg, the center of the dominion, far surpasses the eastern city, having nearly 1,700 cars registered at the end of 1912 and at the present writing the number has grown to nearly 1,800 in actual service, with more than 100 more to be delivered to purchasers April 1.

The business done in the west will far surpass that of the east in 1912, and it is safe to assert that the total number of cars owned in the entire dominion will show the larger proportion as being owned by western farmers and citizens of the larger towns and cities. The license year for Manitoba ends on March 31 each year, and the official figures for this province give the total number of cars registered in 1911 as 2,862, with an additional 262 motor cycles. Saskatchewan, the adjoining province, runs this total a very close second with a registration of over 2,400, while Alberta has about 1,800.

The commercial vehicle also is becoming a factor to be reckoned with in the west as many of the leading merchants and departmental stores are realizing the value of the motor vehicle for delivery purposes and are placing orders for immediate delivery. Most of the railway and express companies are also installing a motor truck fleet, and in the case of the Hudson's Bay Co. orders for trucks total no fewer than eighteen machines to be in service in 1912.

Representatives of American manufacturers who have been in touch with western Canada for the past 2 or 3 years have been astonished at the rapid growth of the business and they are sparing no efforts to become firmly established through the medium of a good agency.

Big Bodies May Merge

Either N. A. A. M. or Board of Trade to Dissolve, Latest Idea of Makers

NEW YORK, March 5—Special telegram —One national organization of car makers instead of two or more was the scheme outlined today in the action taken by the executive committee of the National Association of Automobile Manufacturers. The matter of amalgamating the Automobile Board of Trade with the N. A. A. M. was considered and the subject was referred to a joint committee to be appointed from each society.

Action by the N. A. A. M. is equal to acceptance by the board of trade as the composition of the two organizations is practically identical save for the fact that the former is larger. The difficulty that stands in the way of accomplishing the merger is not unwillingness on both sides. The facts are that the charter of the N. A. A. M. as it stands at present is not broad enough to include the other organization and some sort of an amendment will probably be made to fit the case.

Fifty-Eight Cars in French Grand Prix

Thirty-Three Nominated in 183-Inch Class—Dieppe Course Selected for International Road Race Next June—Bruce-Brown, de Palma and Wagner the Fiat Drivers—Discussion of Speed Possibilities

PARIS, Feb. 23—David Bruce-Brown, Ralph de Palma, and Louis Wagner have been entered to drive three Fiat cars in the French grand prix race at Dieppe next June. When the lists were open at ordinary fees the Fiat refused to enter, but at the same time declined to be bound by the Italian and German boycott of the race. Within only a few days of the final closing at double fees they have put in what is considered one of the most dangerous teams.

It is understood that the Fiat cars will be entered in the unlimited powered class, and may be either the same or similar cars to those which ran at Savannah last November. The total number of fully paid entries for the race now stands at fifty-three, these comprising both 3-liter and unlimited-powered cars. It is very probable, however, that before the final closing there will be a further increase, for the Fiat entry and the large number of English cars have aroused the big French manufacturers to a sense of the danger from non-participation. It is known, for instance, that Louis Renault has built a set of five racers having a bore and stroke of 5.9 by 7.08 inches; it is probable that three of these will be entered at the last moment, notwithstanding the fact that Louis Renault is not a very fervent supporter of road racing. A few other firms have also made preparations and may come in before the closing of the books; thus it is possible that the complete list will show sixty cars, with about fifty-four actually starting.

Panhard Reconsiders

Panhard-Levassor having secured the services of a well-known race driver and engaged an engineer responsible for the production of a number of successful racing motors, it was confidently expected a few weeks ago that this firm would start in the grand prix race. Rumor had it that Knight motors would be used. Since then there has been a change of opinion among the directors and Panhard participation is most improbable.

Preparations for the race are well advanced. It has just been decided that the course will be the same as the one used in 1907 and 1908. For a time it was thought that a shorter course would be adopted, but this was merely a false move on the part of the organizers to tame some of the rapacious landowners. When it looked as if they were going to lose the race altogether, the farmers quickly brought down their rates to a reasonable tariff. Grandstands are being prepared on the same site as during 1907 and 1908,

PARIS, March 1—Special cablegram—Today the final lists for the grand prix road race of the Automobile Club of France closed and the count discloses fifty-eight cars entered for the international event which is set for this summer and which marks the return of France to the racing game. When the entries at ordinary rates closed 2 months ago there were forty-nine nominations in. Since that time nine more have declared at double fees. There are thirty-three of the cars in the light-car division of the race and twenty-five in the unlimited class.

It has been decided that the big event shall be contested over the Dieppe course, that town having subscribed \$15,000 to get the concession.

within about 2½ miles of the town of Dieppe, and in such a position that the cars can be seen on two legs of the triangular course.

English Drivers Try Course

Manufacturers are also well prepared. During the present week the Sunbeam team has been on the course with its grand prix cars. The drivers were Louis Coatalen, Emile Medinger and Rigal. The first of the Rolland-Pilain cars, driven by Pilain, also has been out. The three Sizaire-Naudins are ready for the road, and the Aleyons are receiving their finishing touches.

One of the most interesting features of the race will be the struggle between the 3-liter and the unlimited-powered cars. Certain makers believe that it is impossible for cars with a cylinder area of 183 cubic inches to maintain the same speed as racers with three, four, or five times the cylinder area; others believe that the long distance—1,000 to 1,200 miles—will favor the light cars. Charles Faroux, a recognized French racing expert, after a close study of the problem, concludes that

the small cars will have a maximum speed about equal to that of the unlimited racers, but will have great difficulty in beating them in the 2-day race. He points out that the speed of the big cars will be limited by tires. In 1907 Duray's Dietrich and the winning Fiat were capable of 82 miles an hour on the level, and the fastest round was made at an average of 75 miles an hour. The following year, on the same course the winning Mercedes could do 99 miles an hour on the level; the fastest round was at an average of 80 miles an hour, and the fastest unofficial round worked out at 83 miles an hour. Thus the cars of 1908 were much faster than those of 1907; yet the average speed for the full distance was 70.5 miles in 1907, compared with 69.1 in 1908, notwithstanding that the weather conditions were all in favor of the latter year.

From this he concludes that unless tires are much better now than they were 4 years ago, there is nothing to be gained by exceeding a speed of 93 miles an hour. This year's unlimited-powered cars doubtless will be capable of 100 to 105 miles an hour; they could be made faster, if the tire factor could be ignored.

Tires a Big Factor

With a maximum speed of 105 miles an hour the average for a round will be 80.7 miles an hour. But a single puncture will cause a loss of 3 minutes—30 seconds to stop, 2 minutes to change, and 30 seconds to get away—and to remain those 3 minutes and still maintain the average of 80 miles an hour, it will be necessary for the car to run for 1 hour 20 minutes at an average of 83.8 miles an hour. In other words, the 3 minutes never can be



DIEPPE CIRCUIT GOING INTO SAINT MARTIN

regained. A car running regularly at 74.5 miles an hour would be capable of beating one running at 80.7 miles if the latter had but one puncture per round more than the former. From this it can be concluded that the unlimited cars will not exceed 100 miles an hour on the level, and the question is "Can the small cars show the same speed?" The big cars doubtless will have 135-millimeter tires at the rear, as in 1908, while the small ones will have 105-millimeter, but it is practically certain that the latter will give as good service as the former.

Hardly Light Cars

The 3-liter cars, too often designated light cars, have imposed a minimum of 1,763 pounds empty, which is equivalent to 2,535 pounds in full running order. The big racers of 4 years ago weighed 2,866 in full running order, but could be reduced to 2,645 pounds; thus there is very little difference in the matter of weight between the two sets of cars. With a four-cylinder motor of 3.34 by 5.19-inch bore and stroke, which corresponds to 3 liters and is the dimension most favored, it is possible to get at least 90 horsepower. As proof that this power can be obtained from such a small motor, Charles Faroux declares that with a motor of 3.1 by 5.1 inches bore and stroke, turning at 3,300 revolutions a minute, and having the following timing, intake opening 6 degrees lead, closing 36 degrees late, exhaust opening 70 degrees lead, closing 24 degrees late, he was able to get 77 horsepower, and better results could have been obtained. With the motor delivering 90 horsepower, it would be possible to transmit 72 to 75 horsepower to the driving wheels, the differential being abolished.

Figuring on Speed

Calculating on a weight of 2,425 pounds and employing the most accurate formulae on wind resistance, the car would be capable of 95 miles an hour on the level, which is sufficiently near the speed of the unlimited power racers to make it dangerous. It has to be borne in mind, however, that while the driver of the big car need have no uneasiness about his motor, it is not the same for the driver of the small car, who knows that his engine is working close to its extreme limits. This shows the value of the light car rules compared with the conditions for the unlimited-powered cars. The makers of the latter are operating on familiar ground, and consequently will never show any really important progress. For the small cars, on the other hand, progress has to be made in metallurgy, ignition, carburation, and in the technique of explosion motors. In conclusion, the 3-liter cars will develop 90 horsepower and be capable of 95 miles an hour; we shall have to wait until the time of the race to see if this will be sufficient to beat the monsters of unlimited power.



DIEPPE COURSE NEAR VILLAGE OF LOUDIENERE

French in a Long Tour

Sixty-Two Cars, Five of Them Americans, Taking Part in Big Demonstration

PARIS, March 1—Special cablegram—Five American cars—three Fords, a Reo and a Hupmobile—are among the sixty-two contestants which started this morning in the 240-mile reliability test around France, which will last 20 days. The affair is promoted by the Automobile Club of France, and is in daily stages of 210 miles each, with the average pace 18½ miles an hour. The contest is far from being strenuous—more like last year's American Glidden—being more in the nature of a selling demonstration than a technical competition. All the drivers are called upon to do is to maintain the average pace set by the club. The route that is being followed takes in Nancy, Dijon, Lyons, Grenoble, Nice, Marseilles, Narbonne, Toulous, Bordeaux, Nantes, Rouen and Amiens.

SUSPENSION FOR MOROSS

New York, March 2—E. A. Moross and his agent, W. H. Wellman, have been disqualified and suspended for a period of 60 days to and including April 20, 1912, for violation of rule 21 of the contest rules of the American Automobile Association, reading:

21. Postponement and Abandonment—After the receipt of entries no contest shall be abandoned without the consent of the contest board, except that on the day of the race the referee may order a postponement.

Moross made formal application to the contest board for official sanction for the promotion by him of race meetings at the track of the Crescent City Jockey Club, New Orleans, La., on February 17 and 18, during the annual Mardi Gras carnival and these dates were assigned him by the contest board. Entry blanks were issued and the meetings advertised.

Moross's agent and representative in New Orleans, W. H. Wellman, 2 days previous to the scheduled dates, cancelled and abandoned the meetings without securing the consent of the contest board to such abandonment and without furnishing the board with specific or satisfactory reasons therefor.

AMERICANS IN SWEDISH RUN

Stockholm, Sweden, Feb. 16—The results of the Swedish reliability trials were announced here last night and the prizes distributed. The Opel, driven by Naren, was awarded first prize in class I and the English Vauxhall, Kjeugren driving, was named as second. The fact that seven cars in one class and three in another finished with perfect scores made the work of the judges difficult. The only way of making a distinction between the unpenalized entries was by allowing the difference between the actual driving time of the cars and the ideal driving time decide. As this was a matter of seconds only in the 600 miles of the course, the results were very close. The American cars made a very good showing, particularly in class 2, a Buick finishing second, Overland third, and the two Fords seventh and eighth.

ASKS BIG MONEY FOR ROADS

Toronto, Can., March 1—Paul D. Sargent, assistant director of good road from Washington, addressed a meeting of the Ontario Good Roads Association here last Tuesday. The convention was held for the purpose of getting into concrete form a proposition that would aid the federal and provincial governments in drafting a feasible policy for the distribution of the appropriations contemplated. The convention was not at all modest in summing up its requirements. It passed a resolution asking the dominion government to set aside \$50,000,000 for the purpose of assisting good roads.

Toronto Shows Are Paying Investments

Canadians Take So Kindly to Affair in Armories That Exhibition Is Continued 2 Days Longer Than Scheduled—Every Commercial Car Displayed Sold During Week—St. Lawrence Arena Draws Well

TORONTO, Can., March 1—The intense local enthusiasm aroused by the exhibits of motor cars at the big show in the armories here found practical demonstration in the decision of the management of the show to continue the exhibition 2 days beyond the week originally set. Instead of closing on the night of February 28, there was general satisfaction expressed by the exhibitors with the determination of the manager to extend the time, and every car and accessory remained in its place until tonight.

Exhibitors continued to apply for space up to Monday last after the show had been open 4 days. In all there were 167 exhibitors and a fairly accurate estimate of the value of the cars in the armories and annexes reaches closely upon \$1,000,000. This was an increase in the number of exhibitors of 40 per cent over last year.

For the first time in the history of motor shows in Toronto a certain and well-defined national interest has been taken in it. There were inquiring ones present from Montreal to Vancouver, and from reports there have been more sub-agencies appointed for the northwest than for any other part of the dominion. But the agents here are strongly averse to giving out a list of their appointments.

The actual sales probably would average three for the passenger cars shown.

The outstanding feature of this show, probably, was the interest taken in commercial cars. Every commercial car in the show was sold outright. Some went to Montreal, others to Ottawa, Hamilton and London. The International Harvester Co., of Akron, O., disposed of seventeen delivery wagons and carried off the palm for actual sales. The Schacht sold out its entire exhibit of three models, one of which was a commercial car, and the White and Flanders exhibits of commercial trucks were all disposed of early in the show. But the prospects for the Toronto commercial trade exceeded all expectations. The Brantford Truck Co., of Brantford, Ont., which really is owned by Detroit men, had so many prospects that it put four cars on the streets immediately on the close of the show to demonstrate the qualities of its trucks. A number of these 1,500-pound trucks will be seen in the Niagara fruit district next season.

Over 30,000 persons, exclusive of pass

holders, attended the show at the armories during the season. The attendance in the evening was highly satisfactory, and although expenses were high, the Ontario Motor League and the Good Roads Association will have a goodly sum divided between them.

The show at the St. Lawrence Arena here, held at the same time as that at the armories, was not altogether the failure it was expected to be. Only eighteen of the fifty-five exhibits contracted for put in an appearance, but there were thirty-six cars on the floor, and every exhibitor did enough business to cover expenses and carry away with him a hatful of prospective sales. Two Ohio cars were sold and Sales Manager Rudisol appointed Campbell Brothers agents at Massey, Ont. Of the Brush six were sold, Harding three, Regal eight and Lambert two. The Clinton and the Hatfield each disposed of the only commercial cars they had on exhibition, and everybody was well pleased. The attendance hugged 5,000 very closely, and it was a better buying crowd than that at the armories, comparatively.

MANY AT DAVENPORT SHOW

Davenport, Ia., March 4—The annual show of the Davenport Automobile Club in the Coliseum, ending Saturday, brought out a large attendance despite the unfavorable weather and local dealers report a considerable increase in sales over last year. All of the available space was taken up and two of the large local dealers were compelled to rent display room in downtown buildings. The increase in the number of dealers and the entries made by Moline and Rock Island agents indicate that a new home for the annual show must be discovered by next year, and as the Coliseum is the largest available building the proposition to erect a suitable show building is being considered. The Tri-city Dealers' Association instead of the Davenport Automobile Club will manage the show in the future.

DES MOINES' THIRD SHOW

Des Moines, Ia., March 4—Des Moines' third annual show, under the auspices of the dealers' association, opened at the Coliseum tonight. Seventy exhibitors representing 125 cars are showing.

Although the third annual show of the Des Moines Automobile Dealers' Association is just starting, a deal has been closed which insures that the 1913 show will be on a much larger scale than any of its predecessors. The dealers' association has just made arrangement for an

auxiliary show next year in the new auditorium, which is now in course of erection. Special attentions to commercial cars will be given and the trucks with motor cycles and accessories will be housed in the Auditorium, giving the entire Coliseum to the display of pleasure cars.

QUINCY SCORES A SUCCESS

Quincy, Ill., March 3—The second annual Mississippi Valley show was held here this week, opening last Monday and closing tonight. There were nearly forty different makes of machines on exhibition, some of the dealers having as high as seven makes, making a total of nearly 100 cars. The weather was very bad, snow and sleet making the roads almost impassable. However, the attendance equalled that of last year, and the dealers all reported satisfactory sales. The management of the show probably will entertain the local dealers at a dinner one evening next week.

WISCONSIN'S ROAD RANK

Milwaukee, Wis., March 2—The announcement by the director of public roads that Wisconsin ranks fourth in total mileage of public roads is hailed with enthusiasm by Wisconsin highway improvement promoters, who believe that in a few years Wisconsin will earn first place in the list of states having the largest mileage of improved roads. Such a condition is likely, as the Badger state has one of the most progressive statutes covering road improvement, which also makes an annual appropriation of \$300,000 to be distributed as state aid to the smaller government units. The Wisconsin mileage of public roads is 11,000. State aid is inducing the construction of many miles of entirely new roads in the newer counties which are as yet sparsely settled.

SYRACUSE CLUB EXPELLED

Syracuse, N. Y., March 2—Following the action of the Automobile Club of Syracuse in refusing longer affiliation with the New York State Automobile Association, the club has been formally expelled. As expressed by one of the officers of the local club, this is much like locking the barn door after the horse is stolen, and the action of the state organization seems worrying the Syracuse men not at all.

Official word of the state association's action was contained in its official organ, the Empire State Motorist, that reached here yesterday. On January 12 the directors of the Syracuse club resolved that they would continue to refuse affiliation with the state body. The local club objected to the amount of the dues assessed upon it by the state body and had failed to qualify in good standing for quite some time. It claimed an unjust discrimina-

Ohio Show Forecasts Much Business

Despite Adverse Weather Conditions, Columbus Reports Prospects for Fine Spring Trade Excellent—Medium-Priced Cars Most in Demand—Industrial Conditions in Center of State Good

tion in that it was supposed to pay as large dues as clubs in the state far larger than it and thought it could use this money to better advantage, so has been doing so. It is disturbed not at all by the fact that the state body has come out publicly with some very uncomplimentary statements.

At the annual banquet of the Syracuse club, held at the Onondaga, Thursday evening, President Smith stated the position of the Syracuse club in this whole matter and asked if the directors had not the support of the club members in the premises. The president was cheered.

CANADIANS TEST KNIGHT MOTOR

Winnipeg, March 2.—To have run for 15 consecutive days, or 360 hours, without a stop and to have also run that time without the aid of additional water, establishes two records for the Silent Knight engine, the engine that drives the Russell car. The engine of a Russell car belonging to J. R. Cote of St. Boniface, and which already had a road record of 21,683 miles, was started at 11 o'clock on February 12, in the show rooms of the Russell Motor Car Co., on Donald street, by Mayor Waugh. This morning at 11 o'clock the mayor stopped the engine.

Tests made just before the stop showed it was perfectly cool and running a little faster than when started, 680 revolutions per minute being indicated. At the start the number of revolutions was 580.

Fred E. H. Luke, manager of the Russell Car Co. in Winnipeg, said that the speed at which the engine was run would mean an actual speed on the road of about 17 miles an hour; that is, in the 360 hours the car would have traveled 6,120 miles.

HELPS OHIO ROAD CAUSE

Columbus, O., March 4.—After a debate of several days, in which many advocates of the good roads movement made speeches, the Ohio constitutional convention in session adopted a resolution providing that the general assembly may contract debts and authorize bond issues of not to exceed \$50,000,000 for the purpose of road construction in Ohio. The plan is to build a system of intercounty roads in Ohio. Of the \$50,000,000 the limit of expenditure for each year is \$10,000,000. One provision is that such wagon roads to be improved shall be determined by general laws.

CARS IN SOUTH DAKOTA

Pierre, S. D., March 4.—There are 11,304 motor cars in South Dakota according to the records of the secretary of state at Pierre. These cars have been registered since the enactment of the registration law in 1905. The increase in motor vehicles for each year is as follows: 1905, 358; 1906, 251; 1907, 314; 1908, 824; 1909, 2,104; 1910, 4,065; 1911, 3,388.

COLUMBUS, O., March 2.—The second annual show opened for a week's run under the most auspicious circumstances in the old federal building at Third and Chestnut streets this evening.

In all forty-seven makes and 128 cars were on the floor when the doors were thrown open to the public. Practically all of the Columbus jobbers and retailers and many of the factories engaged space to show their cars. Motor trucks were much in evidence as a number of the makes were displayed both in trucks and in light delivery wagons. The exhibitors at the show number thirty-four. A number of the retailers who handle two, three or even four lines have cars representing all of the lines for which they are agent. The show is by far the largest and most successful ever held in central Ohio. The attendance at the opening night is estimated between 4,000 and 5,000 persons.

Conditions surrounding the sale of motor cars in Columbus and central Ohio have improved to a large degree in the past few weeks and now all dealers and jobbers unite in the statement that the outlook for business during the spring never was better. While the weather has been very unfavorable for dealers to demonstrate their cars, all retailers report a nice lot of inquiries with many prospects to be closed up just as soon as the weather will permit. Sales which have been closed are far ahead of the records of the corresponding time last year.

The medium-priced cars will be in the best demand in the central part of the Buckeye State. There will be quite a number of the low-priced cars sold but the main run will be to cars between \$900 and \$1,500. This range of prices will take in the demand from the rural sections of the state which will be much larger than ever before. But there will be some market for the high-priced cars and on the whole the prospects are for a good business in the higher class of motor vehicles. Dealers which have a high-priced line have been fortified by taking on a medium-priced line which is quite a help in making sales.

Some of the dealers now report sales which almost equal their entire record of 1911 which in itself was not a bad year by any means. One of the best features of the trade is the disposition on the part of sub-agents in the smaller towns of the state to contract for a larger number of cars with the belief that all

will be sold without a great deal of trouble. Agents now are beginning to worry about deliveries in certain lines and some are talking of increasing their requisitions placed with the factories.

Generally speaking, industrial conditions in central Ohio are not bad at all. At least Columbus and surrounding territory has not been feeling the agitation in business circles because of the diversified nature of her industries. As a result there is no curtailing of the ability to purchase motor cars on the part of the inhabitants of central Ohio.

OSHKOSH MAKES GOOD

Oshkosh, Wis., March 2.—The first annual show given by the Oshkosh Automobile Dealers' Association, February 27 to March 1, not only was a big success, but proved that cities of the smaller class can accomplish a great deal in the way of interesting buyers and spreading the gospel among non-owners. There were twenty-five exhibitors.

The show resulted in bringing into direct contact with cars and dealers hundreds of farmers and city people who never have visited the Chicago, Milwaukee or Minneapolis shows and therefore never have seen a motor exposition. The show opened at the end of the worst blizzard of the year.

FOURTH ON SHOW CIRCUIT

Madison, Wis., March 5.—The fourth show of the minor circuit in Wisconsin is being held at Madison, the state capital, this week under auspices of the Madison Automobile Dealers' Association. The first show was held at Beloit, Wis., the second at La Crosse, Wis., and the third at Oshkosh, Wis., last week. All shows are under the auspices of local dealers' organizations, and it is believed that much more good in certain directions is being accomplished by these shows than by the big circuit shows. The Madison show is being held in the new City Market building, the largest assembly in Madison, and fifteen dealers, besides many supply and accessory dealers, are exhibiting. It opened today and will close Thursday evening, March 7.

SIOUX CITY COUNTS SHOW CROWD

Sioux City, Ia., March 2.—Twenty thousand people visited Sioux City's third annual show which closed here tonight. The Davidson building, covering a quarterblock, was crowded every afternoon and evening. Practically all the dealers report numerous sales of cars during the week.



BOSTON, Mass.—March 3—Although the Boston show carries off the palm in the number of exhibitors of cars, having more makes and more individual cars on view than either New York or Chicago national shows yet it is in the matter of accessories that it drops into third place, New York taking the lead, with Chicago second and Boston third. The figures for the 1912 shows are:

Madison Square garden..... 329 exhibitors
Coliseum, Chicago 297 exhibitors
Boston 200 exhibitors

Strong on Sundries

If Boston is behind numerically it can boast of having a national show in so far as the accessories are concerned, because the show is sanctioned by the Motor and Accessory Manufacturers, the national accessory organization, which takes charge of the sundries in New York and Chicago shows. In the case of Boston this organization takes over all of the space given to accessories, and after allotting space to its members, who wish exhibit, the remainder is turned back to the show management and given out to concerns not members of the national accessory organization. Because of this arrangement nearly all of the big accessory exhibits have their factory names above the exhibits the same as at New York and Chicago, whereas in the car exhibit spaces only the names of the Boston dealers appear, due to the fact that the car end of the exhibition is a dealers' affair.

There are not so many of the big accessory makers here as at New York and Chicago. The Motor and Accessory Manufacturers has a total membership of 258 in good standing and of these 150 exhibited at Madison Square garden, New York, 140 at the Coliseum show, Chicago, and there are an even 100 in Boston.

All of the tire makers are here, with practically the same exhibits seen at the national shows; the oil and grease companies are here in a 100-per cent representation; the carburetor people are here; but the spaces are lacking in exhibits of concerns which build for the manufacturers' trade and not for retail work, such as the big companies building axles.

Boston Exhibits Accessories Not Seen at National Shows

Others conspicuous by their absence are sellers of ball and roller bearings, and many concerns manufacturing castings, forgings, stampings, wheels, springs, etc. In a word, the accessories on exhibition appeal direct to the dealer and individual trade, and those that are exhibiting have come here to demonstrate their wares to the 3,000 dealers, garagemen and sub-agents who have been invited from the six states of New England to attend the show.

Garage and Factory Machinery

One very conspicuous feature of the show is the exhibit of garage and factory machinery. More than half a dozen spaces are given over to big machinery houses, which show their machines in operation, such as grinders, lathes, sheet metal cutters, drills, etc. New England is the home of factory machinery and it is but meet that such concerns should be here in abundance. To go a step further, it would seem that Boston might make a strong bid for such exhibits in the future and, in this particular line, might become of national importance. There is not any reason why the manufacturers of factory machinery could not bring their latest inventions here and demonstrate them to the buyers. If a specialty were made of this it would be possible to get many of the car factories interested, so that they would send their representatives along. In this respect New England would occupy a unique position, and would start in America a movement that would give a new phase of interest to the motor car. It always is interesting to know how a thing is made. First we want to know the article, and then the second natural step is to know of its manufacture.

With such an exhibition it would be necessary to have all of the machinery in operation and show the pieces in process of manufacture. In some instances this would be more or less noisy, but the in-

terest shown would be as great if not greater than in the accessory and car spaces. A spark plug in itself is not a marvel of interest; by having it sparking a little interest is added, but it is becoming like a tale that is told; adding a new chapter, showing it in processes of assembly would open a new field and create an entirely new interest in the matter.

The combination spring and rubber tire for pleasure cars and commercials also is attracting attention, two makers showing such. In both a series of springs is used within a hollow channel felloe. Some of the springs are mounted radially, some oblique-circumferentially, and the resilience of these is claimed to compensate for pneumatics. In the Comfort wheel, a California invention, there are, as Fig. 1 shows, three springs—a stout radial, an arc-shaped leaf and two diagonally placed coil springs. An ordinary wheel has about six series of these within the felloe. These springs are all placed between the wood felloe and a flat band which carries the solid rubber tire. The load is carried on the radial and arc-shaped springs, the diagonal coil springs aiding. The torque is transmitted from the wood felloe to the outer rim by the arc-shaped springs as well as through the diagonals. Davies Mfg. Co., Detroit, Mich.

Ellis Cushion Wheel

The Ellis cushion wheel has an interconnected diagonal spring system extending throughout the entire annular space between the wood felloe and the metal rim carrying the tire. In this wheel the rubber tire is made in about six or seven sections, instead of an endless band and these sections can be attached and detached separately. Fig. 2 explains the interconnected spring system. The felloe part F carries throughout its circle a series of levers L, fulcrumed on a radial support A on the felloe. One end of the

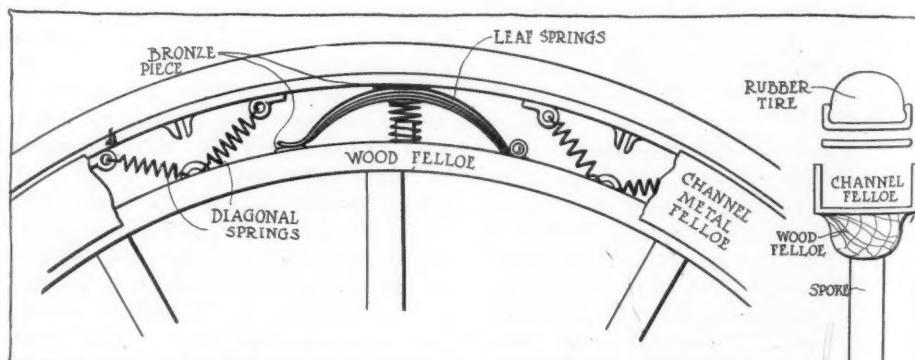


FIG. 1—COMFORT WHEEL, A CALIFORNIA INVENTION

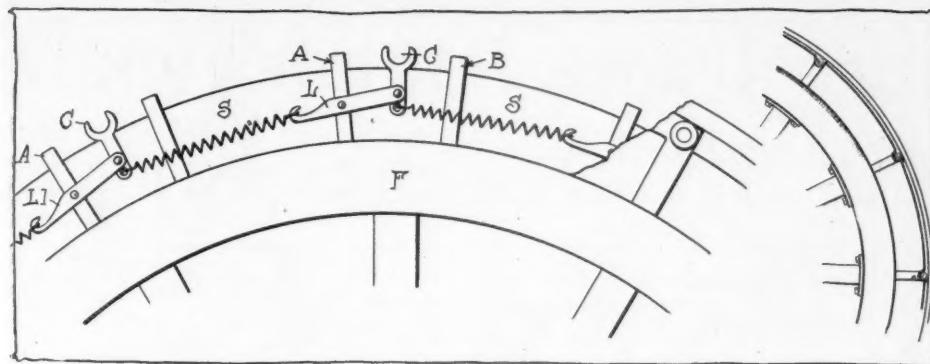


FIG. 2—ELLIS CUSHION WHEEL

lever hooks into the end of the spring S and the opposite end of the spring couples with the adjacent lever L1. On one end of each lever is a pivoted yoke piece C in the yoke end of which rides a segment of the rim carrying the rubber tire. Each segment in reality rides on a set of three yokes. In this way all of the levers L and L1, etc., are interconnected by springs S and each lever carries a yoke portion C. As the segments of the tire approach the ground, when the wheel rotates, the yokes C are pressed towards the wheel hub, the many springs S being extended and thus is the resilience obtained. It is not one spring or two that absorb the weight but the entire set of them. Steel Cushion Tire Co., New York.

Portable Blacksmith Shop

Perhaps one of the most useful garage machines seen is the portable blacksmith shop, Fig. 3. It is a combination tool, mounted on a four-caster truck so it can be drawn from one part of a garage or repairshop to another, or taken out on the street or alley beside the car. It contains a forge, an anvil, a vise, a pipe vise, an emery wheel, a drill, a circular saw and other combinations. The forge has a firepot at one end 16 inches deep with a rotary blower in combination; the anvil is 13 inches long, with a 4 by 6-inch polished face and is made from chilled manganese iron; the vise has 4-inch jaws opening 8 inches; the movable part of the vise constitutes the anvil; the pipe vise will take any pipe from 1-3 inch to 3 inches in diameter; the emery wheel is 5 inches in diameter; and the drill press is geared 2 to 1 and is fitted with a Barber adjustable chuck to take drills ranging from 0 to $\frac{1}{2}$ inch. Other equipment is furnished. Detroit Tool Co., Detroit, Mich.

There is another Knight motor, invented by a Miss Margaret Knight, whose name is spelled the same as Charles Y. Knight of international fame for the invention of the double-sleeve motor. Seen for the first time at a show is Miss Knight's invention known as the K-D motor. The motor shown is a four-cylinder design, 4-inch bore and 6-inch stroke. It is a non-poppet type with a reciprocating semi-cylindrical sleeve at

one side to admit the mixture and a similar sleeve at the opposite side to liberate the exhaust. Each sleeve is semi-circular, in a word, each is of the same shape as a length of stove pipe divided in halves by a cut from end to end. These sleeves are reciprocated 2 inches at a one-to-two movement, or at half crankshaft speed. They are located between two stationary cylinder walls and the piston reciprocates within the inner cylinder. The outer cylinder is waterjacketed, is cast integrally with the cylinder head and is removable; and when removed exposes the two sleeves, the stationary inner cylinder and the top of the piston.

But this motor has one more peculiarity, namely that the bottom of the main or inner cylinder is inclosed beneath the piston and also is waterjacketed, and the exhaust gases, instead of being liberated direct from the combustion chamber above the piston, are conducted to the space beneath the piston and used to force the piston up, thereby acting more or less as a double-acting motor. In order to do this the main piston is on a steam-type of connecting rod which passes through a stuffing-box and to the lower

end is attached to a second connecting rod that unites with the crankshaft. The motor on exhibition has not run very much and no information as to its rating is attainable at present. Externally the motor is quite conventional with its four separately-cast cylinders, and the transfer exhaust pipes at one side and the intake manifold and final exhaust manifold at the other side. The motor shown uses two camshafts, one for each set of sleeves. Exposed timing gears are used. Nothing definite could be obtained on the patents held on this motor. Margaret E. Knight, South Framingham, Mass.

Ames Garage Jack

Owners of cars are realizing more and more the value of taking the car weight off the tires when in the garage. To do this the Ames jack is intended. Fig. 4 shows two views of the jack for lifting the front wheels off the garage floor, by simply running the car onto the jack when entering the garage. The front axle is carried on the two arms A which can be screwed to the desired height to take the axle and then locked. The ready position of the jack is obtained by unhooking a latch L which breaks the back of the two arms B and tilts the arms A forward and lowers them, so that the car can be driven onto them. A few inches further movement of the car, carries arms A into the vertical position, lifting the car wheels off the floor and bringing the jack into the up position, whence it is locked by the latch L, the hooked end of which enters a locking slot in the rear arm A. To remove the car unlock the latch and push the car backward off the jack. A similar jack can be used for the rear axle, and must be set in the proper relative position on the garage floor.

In case it is not satisfactory to drive the car onto the jack a short handle is furnished in order to place the jack under the car and elevate it. A car with both axles on such jacks can be wheeled to any place in the garage. Ames Automobile Truck Jack, Franklin, Penn.

Lunt-Moss Air Compressors

The Lunt-Moss air compressors for garages are air-cooled single and twin-cylinder types. The single-cylinder compressor has a cylinder 1 13-16 inches in diameter with a piston with 2.5-inch stroke. It is guaranteed to maintain a

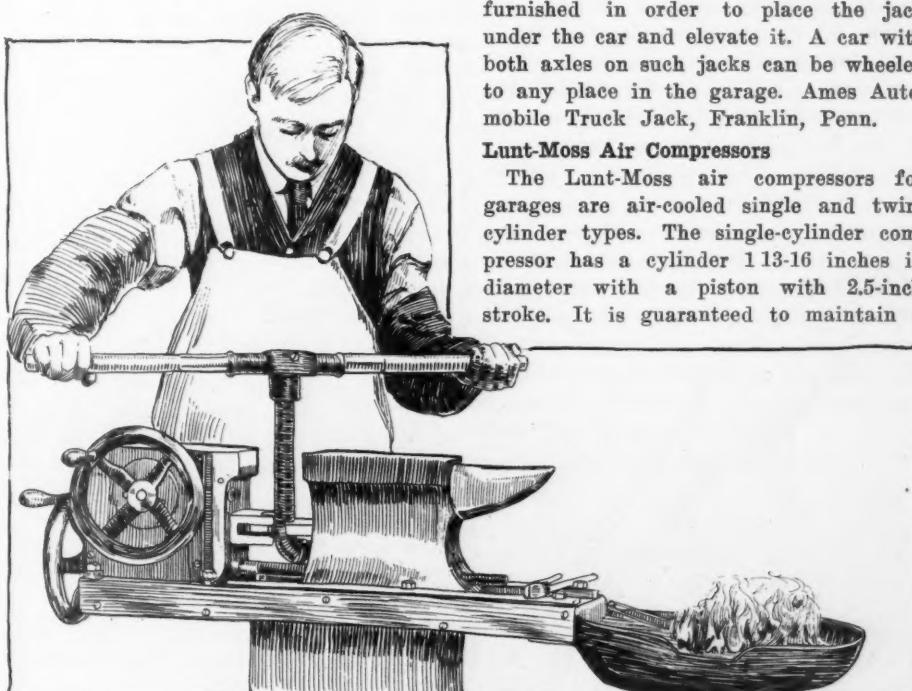


FIG. 3—DETROIT TOOL CO.'S PORTABLE BLACKSMITH SHOP

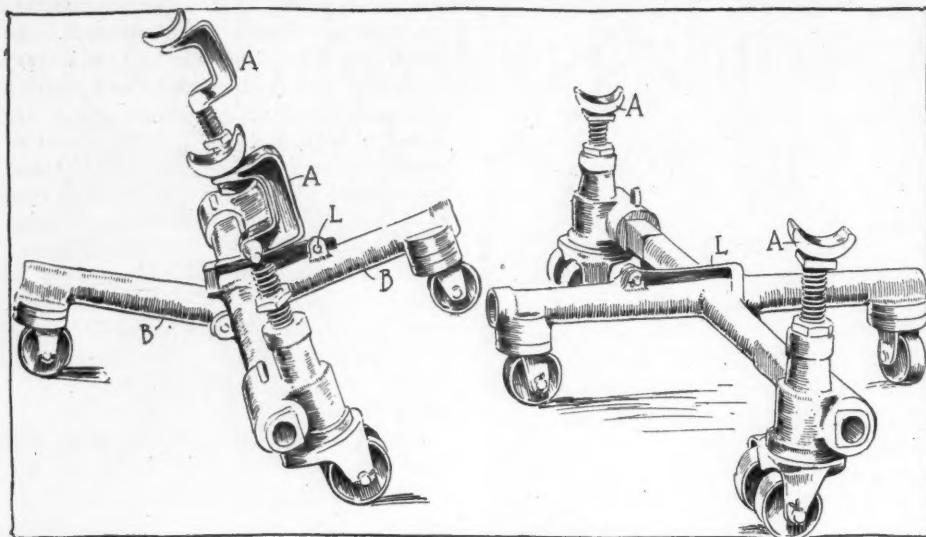


FIG. 4—TWO VIEWS OF AMES JACK

pressure of 100 pounds to the square inch. The safety valves are set at a pressure of 70 pounds. This compressor may be run by belt, gears or chain and should operate at 300 revolutions per minute. It has an overall height of 13 inches. The twin-cylinder compressor is practically a duplicate of the single-cylinder in all specifications. There is a water-jacketed type with a 3 by 4-inch cylinder. It is claimed to compress 2 to 3 cubic feet per minute at a speed of 200 revolutions. It is driven by a 24-inch pulley with 3-inch face. Lunt-Moss Co., Boston, Mass.

Fitzall Ratchet Wrench

The Fitzall ratchet wrench, Fig. 5, is made on the inclined plane principle. The stationary jaw is part of the handle, and the movable jaw is pivoted to a wedge-shaped sleeve. The inner face of the movable jaw rides on the smooth inclined face of the handle. To anchor the wrench to a nut or piece of pipe, the weight of the movable jaw carries it down into position; to release it is but necessary to pull up on the handle. For pipe uses, a curved tool block is used in the fixed jaw. This is removable in case of wear. Standard Wrench and Tool Co., Providence, R. I.

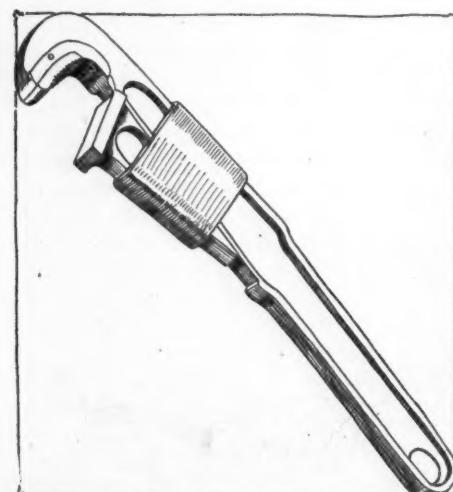


FIG. 5—FITZALL WRENCH

Tire devices are being brought out all over the country and this show has its quota of new ones. Reference is made here only to styles not seen at previous shows or described recently in Motor Age. The Tyrian anti-skid tire has a plain central tread strip made of a high percentage of para rubber. At either side of it is a circumferential slot, wider at the bottom than at the top, so that with the compression of the center tread strip mud and dirt are forced out of the circumferential slot; in a word, the slot is claimed to be self-cleaning. Tyre Rubber Co., Boston, Mass.

An external blowout patch is the Utility. It is a steel-studded fabric-rubber arc-shaped patch, with curved steel hooks at each side to fit under the lip of the clincher rim. Utility Tread Co., Endicott, N. Y.

The basic principle of the Hartford spark plug is that when the wire terminals, where the spark occurs, are heated and expand, the gap which the spark must bridge remains the same. Fig. 6 shows the lower end, with the two hook-shaped wires and the semi-spherical electrode. When the arc-shaped terminals are heated, they expand on a tangent to the surface of the central electrode thus maintaining the same length of gap. Using two arc-shaped wires affords a double path for the current. C. S. Knowles, Boston.

Bull's-Eye Spark Plug

In the Bull's-Eye spark plug there are three very small circular glass windows in the hexagon head of the socket, and whenever the spark jumps the gap in the lower end, at the spark points, the light shows through these windows. It constitutes a ready means of discovering if the plug is in working condition. It was illustrated in Motor Age, November 9, 1911. There is not any special spark gap in the plug, the light of the spark showing through the glass. G. C. Blickensderfer Co., Stamford, Conn.

The Hartford tire pump is a double-act-

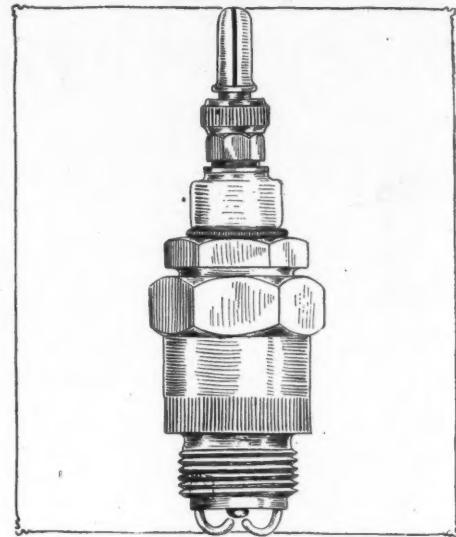


FIG. 6—HARTFORD SPARK PLUG

ing single-cylinder pump driven by motor. It is said to pump 1.5 cubic feet of pure air per minute when running at 500 revolutions. It weighs 10 pounds, is gear-driven, has a vertical height of 9.5 inches, a width of 3.5 inches and is tested to a pressure of 150 pounds. A split gear is given with the pump, this gear being intended to clamp onto the magneto or pump shaft of the car's motor. The pump itself bolts to the car frame by two $\frac{3}{8}$ -inch bolts. The pump has a sliding gear which can be meshed with the clamping gear on the pump or magneto shaft when the pump is used. The Hartford Pump and Mfg. Co., Boston.

Gaylor-Atlas Truck Tire Grips

Tire grips, to be of real help, should be so compact that they can be carried at all times in the tool box of the car, so that they may be attached at a moment's notice when occasion requires. The Gaylor-Atlas quick adjustable grips have been designed to meet such requirements.

The grips fit all widths of tires, either single or dual. The steel shoes are made of various standard sizes set on an angle, therefore a moderate variation in the rim width makes no difference. The grips are so constructed that when they are drawn tight the shoes are caused to hug the rim on both sides of the wheel.

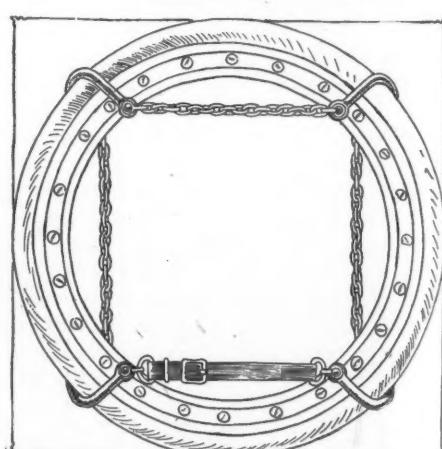


FIG. 7—GAYLOR-ATLAS TIRE GRIPS

Many Motor Cases Pending in Courts

NEW YORK, March 4—Rule day in the United States district court passed uneventfully. There are numerous cases on the court calendar of vast interest to the industry, but none of the new issues is to be heard in March. The four cases of the Enterprise Automobile Co. against Maxwell-Briscoe, the Winton, Locomobile and Saurer have gone over until the first Monday in April by stipulation as previously announced.

The broad spark plug case brought by A. R. Mosler & Co. against several manufacturers of spark plugs alleged to infringe the Canfield patent has gone over to April rule day.

The suit of the Warner Instrument Co. against Stewart & Clark may come to a hearing before rule day. The case of Sager against Grossman, involving the Sager bumper patent, is on the calendar but has twenty-seven cases ahead of it. Unless it is called out of turn it is unlikely that it will be reached within a week.

Suit has been filed by the Allen Auto Specialty Co., of New York, against the Niagara Auto Cover Co. for alleged infringement of another phase of the Nathan patent, No. 799,662. Appearance is due the first Monday of April in the United States district court and answer probably will be filed on May rule day.

In this suit the principle involved is the water-shedding of tire covers featured by the patent. Another suit was filed some time ago involving an entirely different claim of the Nathan patent.

BRINGS OUT A PATENT POINT

New York, March 4—Judge Noyes, in the United States district court, southern district of New York, has rendered an opinion defining another phase of patent procedure, holding that an action to enforce the terms of patent may not also include a prayer for relief on the ground of unfair competition. In the particular case involved the court held that the petition of the Lovell-MacConnell Mfg. Co. against the American Ever Ready Co., in which the basic Klaxon patents were the subject matter, should not contain as a joint issue a proceeding to declare unfair competition. The court ruled that such a provision should be eliminated from the petition. The ruling does not go to the merits of the patent suit, which will be fully tried out in the test case on the main facts.

WANT CLARK DECLARED BANKRUPT

Indianapolis, Ind., March 4—Some of the creditors of the Clark Motor Car Co., Shelbyville, Ind., have filed a petition in the United States circuit court in Indianapolis asking that the company be adjudged bankrupt. The claims of the creditors joining in the petition amount to less than \$600 and the signers are the

Various Suits Come Up on Rule Day in New York—Jonz Makers Reorganizing

Van Camp Hardware and Iron Co., Indianapolis; the B. F. Goodrich Co., Akron, O., and the Ditzler Color Co., Detroit, Mich. The company was located originally at Anderson but was moved to Shelbyville some months ago and recently John Clark, designer of the Clark car manufactured by the concern, withdrew from the concern. Only a few men have been employed recently.

CLEARING UP CAMERON CASE

New York, March 4—Considerable progress is being made in the Cameron bankruptcy case. An accountant is now going over the books of the concern at Beverley, Mass., and the officers have been summoned to appear for examination as to the affairs of the company. The trustee in bankruptcy has obtained permission to finish up a few cars and when sold the proceeds will be credited to the estate.

BRETZ PREPARING ANSWER

New York, March 4—Answer will be filed on behalf of the J. S. Bretz Co., American representative of the F & S factory, in the suit of the Norma Co. of America on the May rule day of the United States district court. The suit was brought on patents numbered 774,527 and 796,648 and trade mark 42,038. The patents cover a type of magneto bearing, according to William A. Redding, counsel for the defense, and should not be confused with other kinds of bearings not involved in the suit. Mr. Redding explained that the trade mark was brought into the litigation because a few hundred magneto bearings of the type involved in the suit were stamped with the name Norma. Both sides are confident that they will prevail. The Bretz company alleges that the F & S basic patents antedate those in suit.

TUBE SUIT WITHDRAWN

New York, March 4—Injunction proceedings brought by the Valveless Inner Tube Co., a subsidiary of the Walpole Rubber Co., of Walpole, Mass., to prevent the Sealomatics Parent Syndicate of England from disposing of certain secret processes of manufacture essential in producing the valveless inner tubes in question, have been dismissed following a settlement of the matter out of court.

The Valveless Inner Tube Co. purchased rights to manufacture such tubes under patents 949,947 and 959,960, but subsequently it was discovered that without the

secret formulæ in the possession of the Sealomatics company, the mere patent rights were worthless. It was feared that the formulæ might get into the possession of outside parties, and as a consequence the suit for injunction to prevent the Sealomatics from disposing of such formulæ to any other concern beside the Valveless Inner Tube Co. was started.

Under the terms of the settlement, the Sealomatics company has turned over to the complainant the formulæ in question and the suit has been withdrawn.

JONZ MAKERS REORGANIZING

Thomasville, Ky., March 5—Steps have been taken toward the reorganization of the American Automobile Mfg. Co. of New Albany, Ind., at the termination of the receivership. This was done at a meeting held at the plant this week, when two-thirds of the stock was represented. An organization committee was appointed and authorized to proceed with the reorganization. The members of the committee are: L. A. Boli, Jr., of New Albany, chairman; John Seeger, Charles Hayden, E. L. Boli and Thomas McCullough, of Louisville; Louis Bauer, of St. Matthews, and M. E. Jones, C. Charles Jones, Dr. J. W. Baxter and G. N. Little, of New Albany.

Following the meeting it was announced that the plant, which was equipped to manufacture the Jonz car, will be continued on a larger scale than before. L. A. Boli, vice-president and general manager of the old concern, says that the name of the new company will be the American Automobile Corporation and the capital stock will be \$250,000. The new company will take over the stock of the old concern and the old stockholders, who have filed claims against the company to the amount of \$30,000, will be paid 40 per cent of their claims in stock in the new company. Outside creditors, Mr. Boli said, would be paid in full by the new company.

Mr. Boli said he believes about 60 days will be required to complete the organization and lift the receivership. He also announced, that in the meantime the New Albany Trust Co., the receiver, will apply to the court for permission to complete the manufacture of unfinished cars which the old company had in stock.

VACUUM OIL CO. PROSPERING

Rochester, N. Y., March 1—The Vacuum Oil Co. at its annual meeting here decided to increase its capitalization to \$15,000,000. The following directors were reelected: Charles M. Everest, Edwin Prizer, George C. Whaley, Charles C. Bedford and Charles C. Campbell. The board will meet in New York city March 7 for reorganization. It has been practically decided to increase the board to eight members.



Motorists Realize Lubrication Need

Boston Show Attracts Nearly Every Prominent Oil Concern in Country—Carbonization, Filtering, Viscosity, Gravity and Other Subjects Discussed by the Tradesmen—Grease Makers Also Prominent

BOOSTON, Mass., March 2—Nearly every oil concern in the country is represented at the tenth annual motor show which opened here tonight. This representation convinces the spectator of the paramount importance of lubrication of the car. Not only are the oil people all on hand, but all of them that manufacture greases have their lines represented, and concerns that manufacture greases but not oils are also here. All of these people are here to talk their goods to the dealer, to the garageman and to the individual buyer who attends the show. A Motor Age representative made a complete canvass of the oil and grease situation, visiting each exhibitor, and learning from factory representatives, present at nearly every stand, just what are the practical points of lubrication for oils and also greases.

Carbonization Important Theme

Carbonization seems to be the Alpha and Omega of lubrication, every oil man talks it. It is just as sensible to talk of ice without using water as to think of lubrication without some form or other and amount of carbonization. Carbonization is due in a motor cylinder to the intense heat of the combustion flame burning the oil which works up past the piston into the combustion chamber. This burnt oil is carbon, and often if it remains on the sides of the cylinder walls it will get into small particles and score or scratch the wall so that when the piston is rising on the compression stroke a part of the gas will leak down past the piston through the little furrows formed by the carbon scratch, and thus the compression is lowered, and lower compression means loss of power, due to the force of the explosion being reduced, and often further loss of power in that a mixture of lower compression will burn more slowly and this again will cause extra heating.

Getting Rid of Carbon

All of the carbon formed by burned oil does not remain in the combustion chamber. A great deal of it is blown out with the exhaust in the form of a fine dry powder. Should too much oil work up past the piston on the cylinder wall it will dampen a space on the combustion chamber and to this damp area the newly formed carbon will adhere, and with each successive explosion, the amount of carbon adhering will increase. This carbon due to the heat of explosion may remain almost white hot, incandescent is the word used, so that on the successive compression strokes these glow-

By David Beecroft

ing particles of carbon will be hot enough to ignite the mixture before the spark from the magneto system and pre-ignition will result, which can be detected by the knocking set up in the motor; this knock being due primarily to the explosion taking place before the piston has approached the top dead center, so that the force of the explosion tends to start the piston back on the stroke, instead of keeping it going on the following stroke.

Because of these conditions the aim of oil men is to produce a lubricant as free from carbon as possible and yet have a good oil. The carbon is removed in the general processes of manufacture, but the demand for clear oil by many car owners has led not a few oil makers to bring out a brand of oils known as crystals. These are readily distinguished from the standard light oils by their color, many of which are water white and are truly very transparent as compared with the amber colors of the standard oils. These crystal oils are made from the amber oils by filtering through charcoal or bone dust. This filtering removes a percentage of carbon, and also coloring matter, whether the coloring matter be carbon or not is not definitely known. The filtering process is quite a slow one and is expensive. The bone dust can be used for two or three filterings, after which it must be burned out to remove all of the collected products and render it fit for more service.

Crystal Oils More Expensive

Due to the cost of filtering, the crystal oils are considerably more expensive. One maker sells a light amber oil for cylinders at 45 cents per gallon in barrel lots; but when this same oil is filtered and made into a crystal oil it sells at 75 to 80 cents per gallon in the same quantities. The increase in price is not only due to the filtration cost, but also to the reduction in quantity due to the process, the added price covering shrinkage.

It is a most debatable point as to the amount of carbon it is possible to remove in the filtration process. One factory representative claims by test that it is about 7-100 of 1 per cent. This is a very low percentage, since many oil dealers claim that so long as carbon is kept below 1 per cent it is satisfactory; this to be shown by the carbon test. It would seem that if the quantity of carbon removed in this final filtration process is so small that it would not compensate for the increase in price.

The carbon content in oils naturally suggests the question as to what a good oil should be. In the days of the laboratory of the Association of Licensed Automobile Manufacturers a specialist engineer was employed to make analyses of many oils to determine some of the more important requirements and here are a few of these details: A good oil should be a pure mineral product, that is, it should be made from a mineral or petroleum base. It should have a flash point of at least 400 degrees Fahrenheit. By flash point is meant the temperature at which the oil vaporizes. It should have a viscosity of at least 300. By viscosity is meant the ability of the oil to hold together. It should have a Baume gravity test of 29 to 32; and its carbon residue should not be over 1 per cent. Some of these characteristics will be explained.

Viscosity Important Factor

Viscosity is a most important factor in oils. The standard of measuring viscosity is by a simple instrument in which the speed at which an oil will drop from the small opening in an inverted vessel is measured. The vessel contains a quantity of oil and this oil drips into a vessel of certain size. The viscosity of the oil is the number of seconds required to fill the standard vessel which collects the drops. The oil that is being tested must always be tested at certain temperatures and when viscosity of an oil is given the temperature at which the test was made should be given. In making these tests it is customary to use a temperature of 70 degrees F. for ordinary machinery oils; a temperature of 100 degrees is used for many oils; and for gas engine oils a temperature of 212 degrees is very satisfactory in that this is the temperature of boiling water and it is only necessary to waterjacket the vessel containing the oil to drip, in order to keep it at the desired temperature.

Filling the Drip Vessel

It will be seen that if it took 700 seconds to fill the drip vessel with the oil at 70 degrees, it would not take so long at 100 degrees and still less time when the oil is heated to 212, because the more the oil is heated the thinner it becomes and the quicker it will drop. This suggests the thought that as the temperature of an oil is increased its viscosity is reduced, which is the case.

Oil makers place much importance on the viscosity test, and they also place much importance on the viscosity of an oil taken at different temperatures, such as 100, 212, 300, 500, etc. If by raising the temperature

from 212 to 300 degrees there is a rapid drop in viscosity and a still more rapid drop when raised to 500 degrees, it means that the oil may lose the most of its viscosity within the cylinder of a motor when subjected to the higher temperatures of ignition. On the other hand, if an oil holds its viscosity remarkably well through the lower raises in temperature, it means that it may hold it well for quite high ranges.

An oil with an excellent viscosity in ordinary temperatures may not have any viscosity under very high temperatures, and the valuable oil is the one that will retain its viscosity under temperature and pressure.

Gravity of Oils

When gravity of oils is spoken of it is not specific gravity that is meant but gravity as measured on the Baume scale, the same as gravity of gasoline today. The higher the reading on this scale the lighter the oil. For example, a 76 gasoline is much lighter than a 54 and an oil of 31 gravity is lighter than one with 29 gravity. In comparison with this the specific gravity scale is directly opposite. Specific gravity means the weight of a given volume with relation to the weight of the same volume of water. The weight of water is taken as 1, and if the liquid under test is twice as heavy as water its specific gravity is 2; if it is only half as heavy as water bulk for bulk its specific gravity is .5. With the various crudes from which oils are made the gravity Baume ranges from 22 to 31. These gravities vary in different states. The Pennsylvania crude is stated to range from 29 to 31; and the others range lower than this.

In talking oils every oil merchant makes use of such terms as Light, Medium, Heavy, Very Heavy, Extra Heavy and sometimes Very Light. In using these terms the dealer has in mind gravity, but the buyer may be thinking of color. Lightweight oils are generally used for new motors, motors in which the compression is as perfect as wished for so that the oil has simply to lubricate and is not needed to aid in holding the compression of the motor. These oils may have a gravity around 30. A medium oil will have a little lower gravity but a higher viscosity and also a higher flash point. A heavy oil will have a gravity of perhaps 29 but with a higher viscosity and flash point than either the light or medium.

Theory of Using Oils

Generally the theory of using oils in motor car engines is that in new engines the light oils work excellently, but if an engine gets well worn, the piston rings become worn and there is a loss of compression, then a heavier oil is used, as it will better fill the space around the piston rings and between the rings and the cylinder walls and thus aid in holding compression. It is customary to recommend a heavy oil for used or second-

Saved for New England

New Cars on View at Boston Show and Not at Chicago or New York Shows

BERKSHIRE

The Berkshire Motors Co. has brought two chassis models of the Berkshire cars for 1912. These comprise a four and a six-cylinder motor with separately-cast cylinders and a bore and stroke of $4\frac{1}{2}$ and $5\frac{1}{2}$ inches respectively. Other characteristic features of these cars are a multiple-disk clutch running in oil, sliding gear selective type transmission gearset located amidships, a propeller shaft with two universal joints, floating type of rear axle, with a 3 to 1 gear ratio, and semi-elliptic front and three-quarter elliptic rear springs. In the four-cylinder car, the gearset gives three forward speeds and reverse; the wheels are equipped with 36 by 4-inch front and 36 by $4\frac{1}{2}$ -inch rear tires; and the wheelbase is 124 inches. The six-cylinder car differs from the four in that it has a transmission gearset giving four forward speeds; the wheels have 36 by $4\frac{1}{2}$ -inch front and 37 by 5-inch rear tires; the wheelbase measures 134 inches, and the rear axle has a gear ratio of $2\frac{1}{2}$ to 1.

In the motors a positive force-feed oiling system is employed that conducts the lubricant direct to the various bearings; and a honeycomb radiator and gear-driven centrifugal pump are features of the cooling systems. A self-starting mechanism also is a feature. Wheels are equipped with demountable rims. Any style of body may be fitted, and the equipment includes top, windshield and speedometer.

LENOX

A four-cylinder motor car now is being marketed by the Lenox Motor Car Co., and the company is contemplating the production of a six-cylinder model. The Lenox car has an Excelsior motor with a bore and stroke of $4\frac{1}{2}$ and $5\frac{1}{2}$ inches, and cylinders are cast in pairs. Lubrication of the motor is by means of a circulating system in which oil is forced through the crank-shaft. Ignition is by means of a dual system, and a waterjacketed double-jet carburetor is employed.

Power is transmitted from the motor through a leather-faced cone clutch, a propeller shaft with a single universal joint at the forward end, a selective sliding gearset giving three forward speeds and arranged in unit with the rear axle; and a rear-axle of the semi-floating type. Wheels are equipped with quick-detachable demountable rims fitted with 34 by 4-inch tires front and rear; and the wheelbase is 116 inches. The car is fully equipped except for an electric lighting outfit and self-starting mechanism, which is included for a nominal extra charge.

MOYER

Moyer cars are made in two chassis models, one with a four and the other with a six-cylinder motor, rated at 30 and 45 horsepower respectively. In both models power is transmitted from the motor through a leather-faced cone clutch with springs under the leather to facilitate smooth engagement; a selective gearset located amidships, and a propeller shaft to the rear axle, which is of semi-floating design. The frame is of pressed channel steel mounted on semi-elliptic front and three-quarter elliptic rear springs.

In the four-cylinder model, the cylinders are cast in pairs and have a bore and stroke of $4\frac{1}{2}$ and 5 inches. A centrifugal pump is employed to circulate the water of the cooling system, and a Mea magneto is a feature of the ignition system. The wheelbase is 116 inches.

The six-cylinder model differs from the four in that the cylinders of the motor are cast in threes; they have a bore and stroke of 4 and 5 inches respectively. The wheelbase is 122 inches.

hand cars. In road races, when all of the piston rings but one or perhaps two are taken out, it is the custom of the drivers to use a heavy oil to hold the compression.

In addition to using different weights of oils as outlined there has been much talk in the last few years on cold-test oils, that is, oils that will stand very low temperatures and still flow as a liquid. Oils are listed that are claimed to stand a zero test and others that will flow at temperatures of 5 below. Some makers say that their cold-test oils will not congeal until nearly 20 degrees below zero has been reached. Oils made from Texas crude are noted for their low cold tests.

In selling oils, the oil maker is taking more and more steps to protect his product, it being known that often cheap oils are sold in garages for certain brands of high-grade products. To guard against such practise the policy of selling oils in sealed cans is increasing. The 5-gallon can is a favorite and it is so possible to use a stamped metal seal as to entirely protect the make if the buyer will take the trouble to look for the seal, which is in the pouring spout and is so placed as to entirely obstruct this spout so it cannot be used until the seal is broken.

Many are Grease Makers

Nearly every one of the oil makers is producing a grease and there are some makers not producing oils but are producing greases. Greases, non-fluid oils and non-flowing oils, and other terms including graphites are used in nearly every part of the car except the crankcase and cylinders of the motor, and some of the graphite makers recommend a percentage of graphite to be used with the cylinder oil in the crankcase. The greatest field for the grease is in the timing gears of the motor, the gearbox, the differential, the grease cups of the chassis and the universal joints. Conditions vary somewhat in these different places and call for different consistencies of greases. To explain: a gearbox should have a lubricant that will find its level and yet will not all run off the teeth of the gears. If the lubricant ran off as a thin oil it would be bad on the teeth when starting. In the differential a stiffer lubricant is needed, because often when a liquid lubricant is used it leaks out through the axle tubes and on to the brakes and wheels. Some grease makers have a fibrous appearing lubricant for differential use which is the same in lubricating qualities as that used in the gearboxes but simply of a stiffer consistency. When it comes to grease cups a stiff product is needed. If it were thin and melt it would readily flow out of the cup, but it should not do so, but should remain in them until forced out little by little as needed. Frequently a stiffer grade of grease is used for grease cups in and around the motor than those used on chassis parts, due to the more heat around the motor than on the spring shackles, etc.

Practically all greases used in the motor car are manufactured from a petroleum base. Some have a small fraction of animal fat, others have not.



FATHER OF THE FOREST, THE FAMOUS REDWOOD OF BIG BASIN, CAL.

ONLY in California, in a belt of 200 miles, limited to a few groves, do the redwoods grow. From all over the world tourists come and stand in wonder at the feet of these primeval mammoths of the forest. They are as calm, as introspective as the stone Buddhas of stone temples, unseeing of this petty world and the smallness of man. By sheer majesty they overawe the boldest of men who approach them. Men trifle with the details, cut into the brownish-red thick spongy bark, measure the girth with steel tapes, and strain their heads backward as they try to estimate the height. They ride horses on the fallen trunks, they garage a motor car in the hollow of some gutted tree, and they stand in groups photographed against some monster sequoia, not reaching above the buttress of roots which flow into the ground like gnarled and tortured lava. They tell each other that this tree is 30, that 50 feet around, and that the giant of them all is 90; that this tree is 100 feet high, but the king of the forest there is 300; that hundreds upon hundreds of years have these trees grown slowly, inch by inch. They fill each others' ears with information; by words they hasten to cover the emotion that surges within them. For these monumental trees stand like columns in a silent eternal cathedral that reaches closer to heaven in fact and faith than those stone embodiments built by men.

For years people have gone to the largest grove of these forest giants, entailing a day on the train and another day of stage coaching, with an hour or so beneath the trees. Other groves have been

Route to California's Redwood Park

more inaccessible. Only of late have people realized that not 6 hours from San Francisco is a grove of these famous redwoods. Some of these trees are 50 feet in girth and many are of tremendous height. One would want no better specimens than the "Father of the Forest," and the "Twin Chimneys," the very name of which betokens their height.

Left until recently to the exploitation of creaking campers' wagons and the old-fashioned stage-coach was the California redwood park, more familiarly known as the Big Basin. A government reservation, thus protected against lumber cutters, it is situated in a wild, picturesque amphitheater among the mountains of the coast range south of San Francisco and about 20 miles north of Santa Cruz.

The discovery that these world-famous sequoias lie within an easy day by motor car has met with considerable enthusiasm. The roads have been found more than fair, the scenery varied, with the last 10 miles wondrously awe-inspiring, and at the end a veritable haven of rest among the giants of the forest.

With a car properly equipped, having good cooling ability, and brakes in excellent order, the trip can be made by the shorter route over the Bear Creek road easily in 6 hours by a driver familiar with mountain roads. This road is considered by many dangerous, as there are 4 miles of very steep going, although the surface

is fairly hard. The more devious route is frequently recommended by way of Santa Cruz, which necessitates a folding back on the track and consequent loss of time, but compensates by broadening the motorists' knowledge of the country. The advantages of both routes may be gained by going in by way of Santa Cruz and returning by way of the Bear Creek road to Los Gatos.

From San Francisco the familiar and much used Pacific highway is followed down the valley, past Stanford university to Santa Clara or San Jose. From Stanford university there is a way into the Big Basin but it cannot be recommended as there has been no recent report on the condition of the road. From San Jose the road to Los Gatos is taken. A couple of miles beyond Los Gatos, near Alma, the Bear creek road branches off. The main road continues on through Summit, Soquel, to Santa Cruz, thence the motorist runs from the seaside town back through Felton to Boulder creek, where the Bear creek road is met again. The latter road forms the base of a triangle of which Santa Cruz is the apex.

The most delightful portion of the trip is from Boulder creek into the basin. There is a grade to within 5 miles of the end which can be taken entirely on the high in a car with good hill-climbing ability. The road hugs the mountain for a mile before the summit is reached, with a drop of hundreds of feet from its edge to the canyon below. Threading this is intense enough but the crowning effect is found at the summit, where one attains a

panorama of the Big Basin. It is a sight wondrous and not easily forgotten. From there comes a gradual drop into the forest; the end, Governor's Camp, is reached; and close by are the wondrous redwood trees famed the world over.

SIOUX FALLS TO DUBUQUE

Madison, S. D.—Editor Motor Age—Will Motor Age kindly give me the route from Sioux Falls, S. D., to Dubuque, Ia., through the columns of the Routes and Touring department.—W. A. Rothschild, D.D.S.

Motor through Rowena, Belleclaire, Larchwood, Lester, Rock Rapids, Sheldon, Hartley, Spencer, Sioux Rapids, Marathon-Laurens, Havelock, Rolfe, Gilmore, Humboldt, Fort Dodge, Webster City, Blairsburg, Williams, Wilkie, Alden, Iowa Falls, Ackley, Austinville, Arlington, Parkersburg, New Hartford, Cedar Falls, Waterloo, Jesup, Independence, Manchester, Earlville, Dyersville, Farley, Epworth, Centralia and Dubuque.

MINNEAPOLIS TO PORTLAND, ORE.

Webster, S. D.—Editor Motor Age—Will Motor Age kindly advise me if the Blue Book would give the best information in regard to a proper route from Minneapolis, Minn., to Portland, Ore.? I shall make the trip, possibly in June.—S. L. Potter.

In the 1912 Blue Book, volume 4, there will be a northern route, part of which was covered by the Minnesota state tour in 1911. From Missoula the touring is rather difficult, some people shipping their car to Spokane and again from Snoqualmie to Seattle, and others shipping it the entire distance.

A route which receives the most travel, although there is no data on it such as the Blue Book prints further west than Omaha, Neb., would take you through Iowa, Nebraska, Wyoming, Nevada and Oregon. Between Minneapolis and Newton, Ia., the itinerary is Rosemount, Farmington, Northfield, Dundas, Faribault, Medford, Owatonna, Geneva, Albert Lea, Glenville, Northwood, Ia.; Kensett, Manly, Mason City, Rockwell, Sheffield, Hampton, Ackley, Cleves Station, Whitten, Marshalltown, Laurel, Newton, Colfax, Mitchellville, Des Moines, Waukee, Ontarioville, Adel, Redfield, Dale City, Monteith, Guthrie Center, North Branch, Exira, Oakfield, Atlantic, Marne, Walnut, Avoca, Minden, Neola, Underwood, Weston and Council Bluffs.

This road through Iowa is the famous river-to-river road and through Nebraska you will travel over the North Platte road. Both roads are well sign-boarded.

The Nebraska towns are Omaha, Elkhorn, Waterloo, Fremont, Ames, Northbend, Rogers, Schuyler, Benton, Columbus, Duncan, Silvercreek, Havens, Clarks, Central City, Chapman, Grand Island, Alda, Wood River, Shelton, Gibbon, Buda, Kearney, Odessa, Elm Creek, Overton, Lexington, Cozad, Willow, Gothenburg, Hindrey, Maxwell, North Platte, Paxton, Ogallala, Big Springs, Chappell, Sidney and Kimball.

Through Wyoming you pass through Pine Bluff, Egbert, Archer, Cheyenne, Granite Canyon, Buford, Tie Siding, Red Buttes, Laramie, Rock River, Medicine Bow, Allen, Hanna, Fort Steele, Grenville, Rawlins, Latham, Wamsutter, Tipton, Monell, Bitter Creek, Black Buttes, Rock Springs, Greenriver, Granger, Opal, Diamondville, Cumberland and Evanston. Upon reaching Cheyenne, you might be able to secure a guide book through Wyoming from E. L. Emery which will aid you very much.

From Evanston you motor to Echo, Ogden, Brigham, Kelton, Montello, Corbe, Wells, Deeth, Elko, Palisade, Eureka, Austin, Fallon, Wadsworth and Reno. Entering California through Hobart Mills pass through Truckee, Auburn, Sacra-

mento, Stockton, Oakland and San Francisco. If you do not care to take in San Francisco motor to Marysville from Sacramento, then on to Oroville, Red Bluff, Anderson, Redding, Sisson, Ashland, Medford, Roseburg, Albany, Salem and Portland.

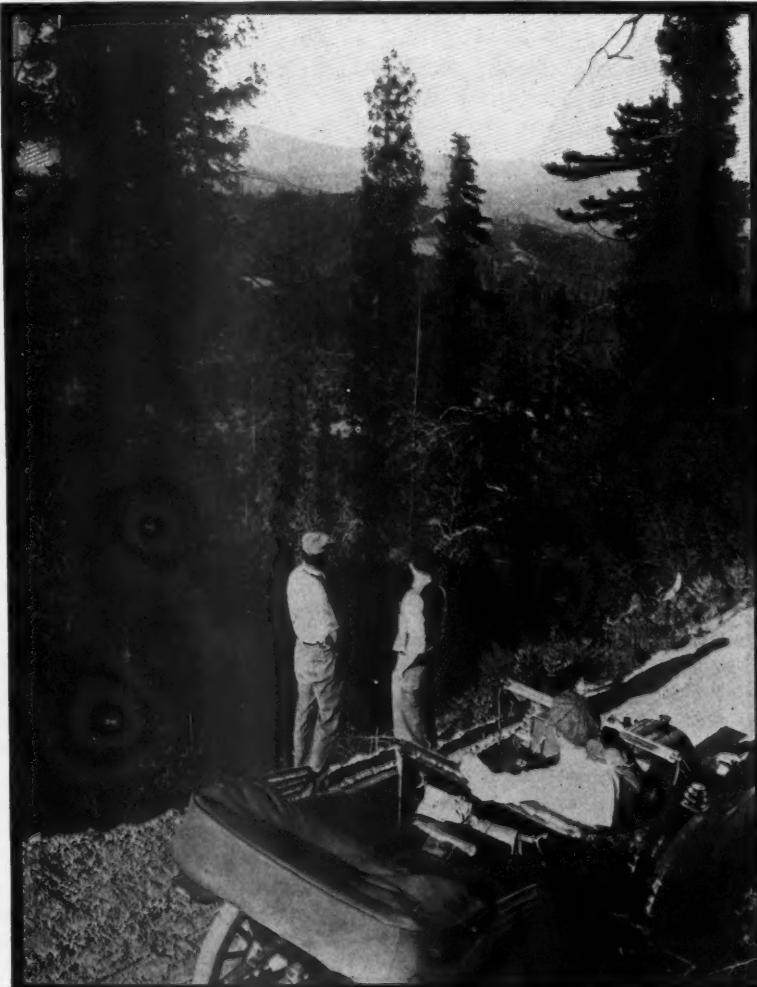
FROM TEXAS TO CALIFORNIA

Amarillo, Tex.—Editor Motor Age—Will Motor Age inform me the best way to go from here to Los Angeles, Cal., in my car to avoid most sand?—W. S. Bryan.

To avoid the most sand will take you a very round-about way. It would be to Denver, Cheyenne, Ogden, Elko, Reno, Sacramento, San Francisco, Soledad, San Louis Obispo and Santa Barbara. Between Amarillo and Cheyenne the towns are Dalhart, Texline, Clayton, Mt. Dora, Des Moines, Dedman, Lakeside Farm, Capular, Raton, Trinidad, El Mora, Barnes, Aguilar, Rugby, Pryan, Rouse, Walsenburg, Pietou, Strong, St. Marys, Greenhorn, Crow, Abbey, Minnequa, Pueblo, Eden, Wigwam, Buttes, Hall, Fountain, Skinner, Colorado Springs, Rosewell, Pike View, Husted, Palmer Lake, Perry Park, Sedalia, Acequia, Littleton, Petersburg, Denver, Broomfield, Lafayette, Longmont, Berthoud, Loveland, Ft. Collins, Tie Siding and Laramie. The balance of this route can be found in this issue in answer to a letter from Webster, S. D.

WRONG DISTANCE

Huron, S. D.—Editor Motor Age—On page 30 of the February 22 issue of Motor Age I notice an article on a new South Dakota road. The mileage given as 280 miles is entirely wrong. I have noticed the same error in the daily papers but think it best to correct it in Motor Age. Entering the state at the east line near Elkton, and following the old Deadwood trail west through Fort Pierre, Meers, Bunker, Ottumwa, Old Trail, Philip, Cottonwood, Quinn, Owanka, Underwood, Rapid City, Black Hawk, Piedmont, Sturgis to Deadwood, the distance will be between 440 and 450 miles. This road continues to the Yellowstone national park. These figures are taken from three Veede odometers. I also think the railroad time tables will show nearly the same distance, as well as measurements taken by section lines of government surveys.—H. O. Wibert.



SUMMIT OF ROAD LEADING TO BIG BASIN, CALIFORNIA

No Fear of Jack Frost

Chicagoan Finds Priming Devices Eliminate All Trouble of Starting in Winter

CHICAGO—Editor Motor Age—I have read several very interesting articles that have appeared in Motor Age this winter from subscribers who have been kind enough to make suggestions for overcoming starting troubles in cold weather, all of them being more or less effective, but requiring considerable loss of time and bother to get results. For instance—in your last number a gentleman from Sauk Center, Minn., is kind enough to explain in detail how he is able to start his motor in the coldest weather by applying flame to his intake manifold, thus vaporizing the gasoline, and his troubles are over until his motor gets cold again. Others suggest draining the radiator at night and refilling with hot water in the morning. Numerous motor cars are seen in Chicago with the hoods wrapped with quilts and others resort to the more common way of getting started by raising the hood and squirting gasoline into the spark plug openings or through priming cups and getting started, but find sometimes that the engine soon dies for want of sufficient gasoline from the carburetor. In such cases the first routine is repeated and a driver waits until the engine is heated before attempting to let in the clutch for fear of killing the motor.

Nine times out of ten the driver blames the carburetor and goes back to his dealer to experiment with a different make. An instance occurred recently in a prominent north side garage in Chicago where two owners both complained of carburetor troubles and the cars were put in the garage at the same time. One owner had one make of carburetor and the other a different one. Neither owner knew of the other's trouble. One man wanted a carburetor of the make used by the other man and vice versa and the obliging garage owner switched the two carburetors and put a priming device on each car. Both owners are perfectly satisfied and have no more carburetor troubles.

In a recent issue of Motor Age I noticed a suggestion from the editor that every manufacturer should equip his cars with a priming device. This suggestion caused me to sit up and take notice, especially as the article occurred simultaneously with a series of instructive articles on gasoline. I investigated and found that a friend of mine had been using a priming device on his car which he operated from the seat and could let in as much or as little gasoline direct to the cylinders through the intake as was necessary to secure easy starting and to keep the motor running until the engine got sufficiently heated up to feed naturally from the carburetor. I found that he could start his motor more than half the time on the spark and prac-

The Readers'

Motor Primers Advocated for Easy Cranking in Cold Weather in Conjunction With Anti-freezing Compounds—Two Other Readers Applaud Argument of Kansan

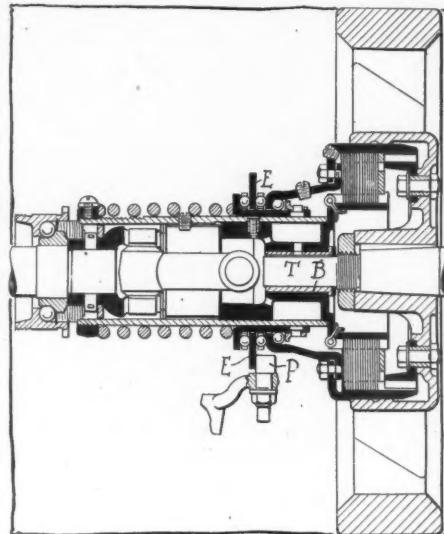


FIG. 1—CURE OF CHATTERING CLUTCH

tically all of the time on the first turn of the starting crank without raising the hood or the slightest difficulty.

I had one put on my 64 Rambler and have bid farewell to starting troubles. I use a solution of water and denatured alcohol in the radiator and have kept my car in a cold barn all winter, with the temperature in the barn quite often as low as zero on the thermometer that hangs on the wall in front of the car. The cost of the primer is insignificant and I understand can be used on any car either with or without a starter. A whole lot of people both in the cities and in the country lay up their cars during the winter months after fighting a cold motor a few mornings when winter sets in and are deprived of the pleasures of motoring in the winter unnecessarily.—A. A. Walters.

ANSWERS S. D. HIRSCHL

Philadelphia, Pa.—Editor Motor Age—In Motor Age, issue January 4, page 89, appeared a communication on the subject of "Inlet Under Pressure." The writer, S. D. Hirschl, wished to know if any attempt had been made to increase the power of a motor under such conditions. I would like to state that the blower arrangement has been used on the Chadwick Great Six speedster for a couple of years, but it has now been given up in favor of a funnel-shaped opening inside the bonnet owing to less expense and complication.—R. L. Stott.

Motor Age would be glad to learn of any other cases where this was tried.

Likes the Light Cars

Motorist Gives Results of Experience With Cars of Different Weights

CHICAGO—Editor Motor Age—Please allow me space in the Readers' Clearing House to compliment J. W. Farmer, of Pratt, Kas., in his answer to Paul Fony, of Dixie, Wash. I have had exactly the same experience with heavy and light cars as Mr. Farmer. I have a Metz car which weighs only 1,000 pounds, with a 22-horsepower engine, bringing me in more clear profit in the rent service than my heavy cars. It takes the place of the horse and buggy at the livery stables with about the same expense per mile. Heavy cars cost more money than small.

Here is an illustration: I purchased a 20-horsepower five-passenger touring car last fall. After using it awhile in the rent service I decided it was too heavy for its tires and engine. I took off the top, windshield, fenders, trunk rack, tool box and dash coil, all amounting to about 500 pounds. Now the car runs 3 to 5 miles more to the gallon of gasoline and I figure tires will last 3,000 to 4,000 miles more.—W. D. Patrick.

TIRE FILLERS NOT STOCK

Fontana, Kas.—Editor Motor Age—1—Have any of the motor car manufacturers adopted the cushion tire, or tire filler, instead of the pneumatic, as standard?

2—Are the cushion tires, or tire fillers, on the market a success? If so, why do not the manufacturers adopt them as standard equipment.—Harry Gardner.

1—None of the car manufacturers have adopted filled tires as stock equipment.

2—Practically all of the cushion tires or tire fillers on the market have a large clientele of satisfied users. There is considerable discussion among motorists as to whether the freedom from tire troubles gained by the use of non-pneumatics pays for the enhanced first cost, the greater weight and the somewhat less easy riding qualities, but most of those who have tried these types of tires are very well satisfied with them. It is universally granted that pneumatics absorb somewhat more, at least, of the road shocks than do the filled or cushion tires, consequently the life of the motor and other parts of the car is longer with pneumatics, and this is one reason that makers equip with pneumatics.

Clearing House

Knight Engine Performances and Comparisons—Worm Gears Explained—Repair of Chattering Clutch—Registration of Drivers—Compressed Air Self-Cranking Devices

Suggests Elevated Walks

Westerner Has Original Idea for Relieving Traffic Congestion

LOS ANGELES, Cal.—Editor Motor Age —In the February 15 issue of Motor Age in an article by William B. Stout on the control of pedestrians, that writer suggests that pedestrians be compelled to obey the whistle of the police the same as the vehicles are doing. While taking it for granted that some relief might be obtained by such means, it also appears to me that such a rule would be very difficult of enforcement because of the great number of pedestrians. In many instances with pedestrians from localities where rush and crush are unknown such a rule would amount to an abridgement of their existence.

Being a driver myself, I fully realize the annoyance and nerve-wear resultant from crossing crowded streets, also the risk one must take to force off, or rather to sheer off the right of way, the foot travelers, and for that reason any relief from such a strain would be welcome to the public at large, riding or walking. The suggestion of Mr. Stout, however, although good, is hardly practical enough to gain much support from others than motor car drivers. My reasons for saying so are:

1—The impossibility of its enforcement. 2—The waste of time to the pedestrians by vehicles which do not go across the street, but turn corners. Here you see the vehicle holds pedestrians for about one-fourth of the curve distance of the sidewalk after they have already been held up by the whistle; whereas, had there been no whistle for foot travelers quite a number might have sneaked across while no one was looking. And all that annoyance would create more dissatisfaction than all the dodging is doing now.

Here is a curative suggestion—elevated walks.

One line of pillars with a cross-arm, probably on the line of the curb, would not take much space off the street below, the width of the walk, of course, to be built according to estimated need. Such walks, if made one-direction walks, would be able to carry a larger stream of people than the present walk can accommodate and would thus prove a benefit not only

to drivers but also to the ox-hide riders as well, for the ox-hide riders would not be subjected to the bumping and other wear and tear as at present where a double opposite stream of people is in continuous motion, and also in a continuous temper-breaking commotion.

Again, by building spurs outside the regular walk, seats could be provided for the halt and the weary, where some little rest might be acceptable, or perhaps a little sunshine could be indulged in without going to the suburbs for the same. As to these spurs, I am bold to say that many a merchant would be willing to support this proposition because by putting in a spur along his store it would give him a second line of show windows in addition to those on the lower level and be quite appreciably an asset to the property.

The point of accessibility would have to be looked after, but then almost every store, office building, hotel, etc., would be ready to make the necessary connections.

These suggestions will perhaps give Mr. Stout material for another article whose suggestion would not meet with as much opposition from the walking public as that in the article in the February 15 issue undoubtedly will. I hope the suggestions contained herein will be glimpsed near the angle of my own viewpoint—Woyt Losky.

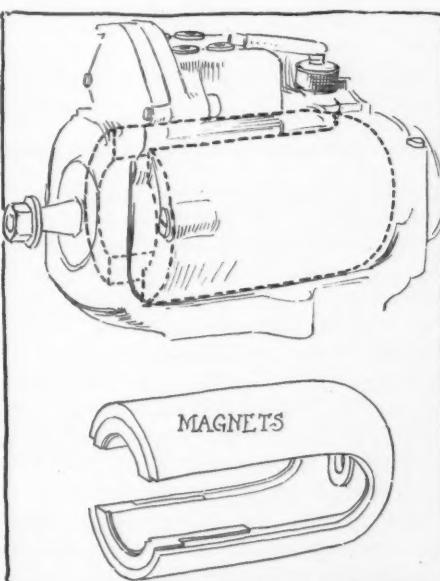


FIG. 2—ARRANGEMENT OF MEA MAGNETS

Low Weight Desirable

Carpenter Comes to Defense of W. J. Farmer on Power and Pounds Question

S AUK CENTER, Minn.—Editor Motor Age—I have had considerable experience in the use of motor cars, and wish to back up W. J. Farmer in the proposition assumed that the light car is the one for us to use. The first car I bought was something like the Scandinavian who on shipboard wanted a pan of potatoes, but not speaking the language and hearing the sailors say "fill'er up," concluded that this meant a pan of potatoes, and his mistake was made known later when he got a 5-bushel sack full of them for "fill'er up."

I did not know, really, what I wanted, but taking the advice of a friend that knew nothing about a motor car, got the heaviest one I could possibly find outside of a truck! And right here was where I fell down. After using it a little over a year my tire trouble began, and continued until I got the selling fever and sold it to one who wanted a good strong freight car! My tire expense was something over \$70 per year. I got sick, indeed, at these figures, but could not make the tires myself so had to buy them, replace them and repair them.

The light car is the coming machine, and Mr. Farmer makes a strong point in the weight of cars as sent out by the manufacturers, and he makes a truthful one, indeed. My present roadster weighs more than 300 pounds more than listed at by the maker, and it is easily seen that the trend is towards lighter cars. Indeed, we find the makers trying to shave off every ounce of iron, steel and material used in the making of the car. As Mr. Farmer says, the light, speedy car can start quicker, stop quicker and is far easier to handle on the crowded street, and in road work no heavy car today can approach it for all kinds of roads, rough, muddy, icy, etc. I saw a big 60-horsepower touring car hopelessly stalled in a mudhole that the light and powerful roadster never would have got stuck in in the first place, and if it had it would have got out of it in one-fourth the time the big car took to do it.

Then comes the expense of the heavy car. Tires cost two and three times as much as the lighter car and wear out three or four times quicker, and the gearing must, of necessity, wear out in like ratio as the tires, and the repairman's charges are much higher on account of the heavy and cumbersome machine being harder to handle. Then again come the parts which cost me three times as much as my present roadster, and the gasoline bill is quite double. A 3,500-pound car will use about 1 gallon per 12 to 14 miles, while the light and powerful roadster will do 25 to 30 miles per gallon. So far as strength is con-

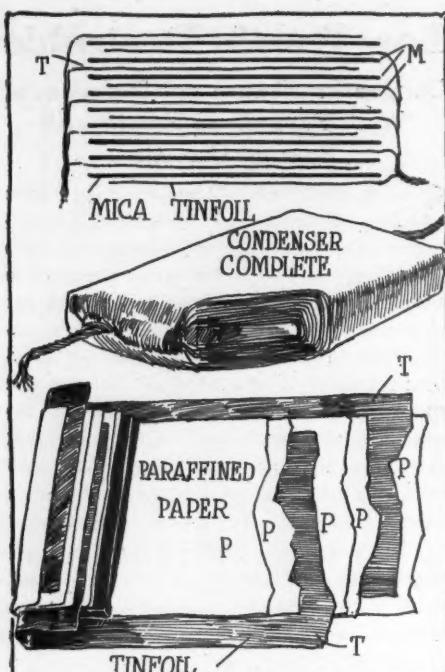


FIG. 3—CONSTRUCTION OF CONDENSER

cerned there is nothing to say in favor of the heavy car as its weight adds only prorata to its strength, and vice versa in the light machine. Vanadium steel is largely used in light cars, and a visit to the shows plainly tell us what this light and strong metal will do in a motor car.

No, we want light cars, new tires, working methods of use and we are very sure the near future will see light cars, better tires, silent machinery, not very much reduction in prices on good cars.—A. D. Carpenter.

HAS A CHATTERING CLUTCH

Kalamazoo, Mich.—Editor Motor Age—Through the Readers' Clearing House kindly inform me how to stop the clutch on a Reo 1910 model from chattering when changing gears. I have tried injecting light cylinder oil and washing out same with kerosene, also used gasoline and did not seem to get any relief.—W. A. Sprague.

Your trouble evidently is due to misalignment of the clutch disks or clutch spider, caused by a worn bushing, B Fig. 1, between the floating portion of the clutch and the tail T of the crankshaft on which it revolves. The remedy for this trouble is to disassemble the clutch and replace the bushing B with a new one. Generally a new bushing from the factory or from the stock of a sub-agent, can be made to fit by running a $\frac{1}{16}$ -inch reamer through it after the new bushing has been pressed into place in the spider. Should the bearing surface of the shaft be scratched or worn, however, and require dressing down, the use of a $\frac{1}{16}$ -inch reamer might make it too large, so the reamer must be used with good judgment.

Another cause for your trouble may be that the clutch operating pins P are not properly adjusted. These pins are eccentrically formed, as shown, so as to allow

Ignition and Vaporizer Queries

Construction of Condenser With Method of Connection in Circuit Outlined for Minnesota Reader and Filter Suggested

WHEATON, Minn.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, answer the following questions:

1—Where are the magnets placed in the Mea magneto?

2—What are the functions of a condenser in a magneto? And how is same constructed?

3—What changes would have to be made on a common induction coil to make a jump spark coil such as the Remy coil?

4—What size carburetor of the Schebler L-type would be best adapted to a 6 $\frac{1}{2}$ by 8 motor running at a speed of from 550 to 750 revolutions per minute? This motor is used on the Big Four gas traction engine manufactured in Minneapolis. It is not equipped with a Schebler carburetor, and I find it impossible to get an adjustment on the one that is fitted that will work on all positions of the throttle. I can close the throttle and adjust so that the engine will hit on all four perfectly, but when the engine begins to pull it will back-fire in the carburetor. If I do not release the clutch it will stop. Then I give it a little more gasoline and it will pull first rate with a medium load, and when it comes to a real hard pull it seems to get too much gasoline and throws a black smoke, and when the plows are pulled out on going around the end of the field or I release the clutch the motor will skip and miss very badly. As soon as I cut the gasoline down it will run perfectly.

It seems to me that if I were to put on the L-type Schebler carburetor I could get a much better mixture at all speeds and positions of the throttle and save a great deal of gasoline.

Does Motor Age think it advisable to change carburetors? If not, how can the

one that is on now be remedied? This engine has a throttle governor which works on the lever of the carburetor, and I am of the opinion that the constant working of the lever might wear out the adjustable place that the roller works on. Does Motor Age think it would or not?

5—Does Motor Age know of a gasoline filter that could be used on this engine, mentioned in question No. 4, that is made something on the order of the drawing shown in Fig. 4. The gasoline pipes are $\frac{1}{4}$ -inch pipe. I would like to get the address of a company making such a filter if Motor Age knows of one.

I think such a filter would be very good if made, as the sediment would have a tendency to settle to the bottom and would not be likely to clog the screen as in the small one used on these engines. We use a wire gauze strainer in filling the gasoline tank, but there seems to be a sediment in the gasoline that has a fiber-like appearance and is so fine that the large strainer does not seem to take it out, and it clogs up the small one next to the carburetor and does not permit of sufficient supply of gasoline to the carburetor. We tried using a chamois skin in filling, but the wind blew so much that it blew a lot of gasoline out of the funnel and wasted so much we came to the conclusion it was an expensive thing to use.

6—Can Motor Age give a reason as to the length of time the platinum points last in different magnetos? I have wondered if the grade of platinum used in the points makes a difference.

7—Will platinumoid give satisfaction if used for breaker points?—Francis A. Ruckle.

1—As shown in Fig. 2 the magnets of the Mea magneto are bell-shaped and are arranged horizontally just inside the

2—Does a driver who tours through those states require a driver's license?—A Subscriber.

1—It is necessary for a chauffeur to register in the states of Michigan and New York. Owners of cars are not required to register. In Michigan a chauffeur is issued an aluminum badge on which are his registration number and the date of expiration, which badge must be worn by the chauffeur in a conspicuous place when operating his car. In New York state the same rule applies.

2—It is not necessary for the driver touring through these states to have a license in the particular state in which he is driving, providing he takes along his

CHAUFFEUR REGISTRATION

Marion, Wis.—Editor Motor Age—Kindly answer the following questions through the Readers' Clearing House:

1—Does a driver in Michigan or New York state require a license?

Proper Carbureter for Tractor

Life of Platinum Breaker Points Shortened by Poor Adjustment—No Test of Platinumoid Recorded—

Location of Mea Magnets

magneto casing and surrounding the armature winding.

2—Primarily, the function of the condenser is to prevent the destructive sparking at the contact points of the circuit breaker. But its advantages are two-fold; for in addition to its duty of preventing the sparking at the contact points of the circuit breaker, it also increases the brilliancy and heat of the spark at the spark plug.

The condenser of an electrical induction or transformer coil, as shown in Fig. 3, consists of a number of superimposed layers of tinfoil T separated from each other by thin sheets of mica M or paraffined paper P. Alternate layers are electrically connected, so that the finished condenser practically consists of two large sheets of tinfoil separated by thin sheets of insulating material. The wires or leads from the condenser are connected so that were the condenser a conductor there would be a path for the primary current through it, even when the platinum contacts were apart. This is shown in the diagram Fig. 7.

3—if the common induction coil to which you refer contains a condenser of the proper size, and has its connections suitably arranged, no changes would be necessary. The wiring diagram Fig. 6 shows the connections provided on the Remy coil, and a diagram showing both the internal and external connections of the entire Remy ignition system was given on page 90 in the January 4 issue of Motor Age.

4—A 2-inch carbureter is the size best adapted to a motor of the dimensions given, but the model D Schebler is recommended as better for the motor in question than a model L. If you contemplate the fitting of a Schebler carbureter, it would

be advisable to take the matter up with the Hollis Electric Co., Minneapolis. This company is the Schebler company's nearest representative. If, however, there are any similar motors in your neighborhood that are equipped with the carbureters about which you complain which are giving satisfactory service, Motor Age would advise that you consult the company making them regarding your trouble. It might be due to some small condition either of the motor or carbureter with which the company is entirely familiar and which might be very easily adjusted without requiring a change.

5—The Schebler company makes a filter, Fig. 5, which is somewhat similar in principle to the one you illustrate. Its construction is shown in Fig. 4.

6—There are a number of things that will affect the life of the platinum points of a magneto, among which are the materials of which the points are made, the care with which the adjustment of the points is maintained, the adaptability of the condenser design and size to the current output, etc. It is claimed that best materials obtainable are employed in the circuit-breaker points by leading American magneto makers. It does not seem reasonable to believe that the makers of these machines would sacrifice their reputations for the extra cost of material in these small but important parts.

Where facilities are not provided for maintaining as fine an adjustment as possible at all times, it is most likely that too wide an adjustment between the points will be maintained; the result is that excessive hammering force is present when the machine is in operation, which is very detrimental.

7—Motor Age has no record of any tests made with platinumoid.

1—Give and explain worm gears, their ratio of speed and power formulæ. What I am desirous of knowing is, if a worm must be turned fifteen times to one revolution of the gear, will the power ratio be the same? That is, if on a certain lever arm X in length a pressure of 1 pound is exerted, will there on a lever arm connected to the gear of a length equal to X be exerted a force equal to fifteen times that pressure applied to the lever connected to worm; namely, 15 pounds?

2—This question is propounded with the knowledge that friction is not to be taken into consideration, so will Motor Age kindly state, also, approximate amount of friction in both cut and cast gears of this particular type?

3—Also kindly explain the difference between gauge and actual compression in cylinders.—H. S. Williams.

1—Yes, allowing for loss in transmission, of course.

2—An efficiency of as high as 93 per cent has been shown by worm gearing under test, all things being favorable. Efficiency depends on accuracy of cutting, hence a cast worm would be a very doubtful proposition except for light load at low speed and with corresponding low efficiency. This is taking it for granted that you mean a gear with cast teeth. The surface of a successful worm and gear must have a mirror-like finish and be in equal contact over all its rubbing surface, or as great a percentage as the design will allow. In theory the contact is very much like that of a plain shaft bearing. For efficiency the surfaces must be smooth.

3—The gauge compression pressure is the actual compression pressure, as the term is usually employed. The gauge shows the difference between the absolute pressure and the pressure of the atmos-

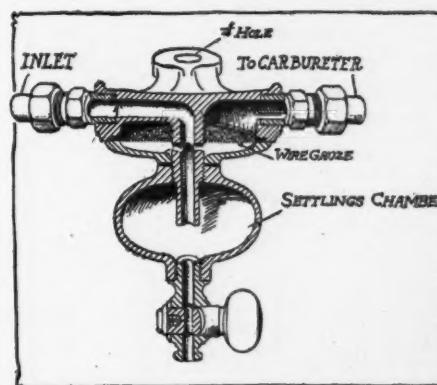


FIG. 4—SCHEBLER GASOLINE FILTER

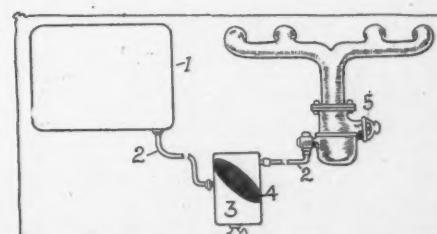


FIG. 5—RUCKLE'S SUGGESTION OF FILTER

credentials showing registration from his home state.

ASKS ABOUT LICENSES

Minneapolis, Minn.—Editor Motor Age—Has Motor Age anything that will give us information on touring in Illinois, Indiana, Ohio, Pennsylvania, District of Columbia, New York, and New Jersey? We wish to ascertain if it will be necessary for us to obtain licenses in each state through which we travel, and how long we can use our Minnesota license.—H. G. Goosman.

A series of books which contain the information you desire is published by the Automobile Blue Book Co., Chicago, and sell for \$2.50 each. You will find Illinois,

Indiana and Ohio included in volume 4 for the middle west; Pennsylvania, New Jersey and Maryland in volume 3; and New York and Canada in volume 1.

Illinois allows the non-resident 60 days touring without charge, and Pennsylvania 10 days; Indiana, Ohio, New York and District of Columbia do not specify any certain length of time; and New Jersey at present requires a state license, but there is a bill up now which if passed will allow a short touring privilege.

REGARDING WORM GEARS

Chicago—Editor Motor Age—Through the columns of the Readers' Clearing House, will Motor Age answer the following questions:

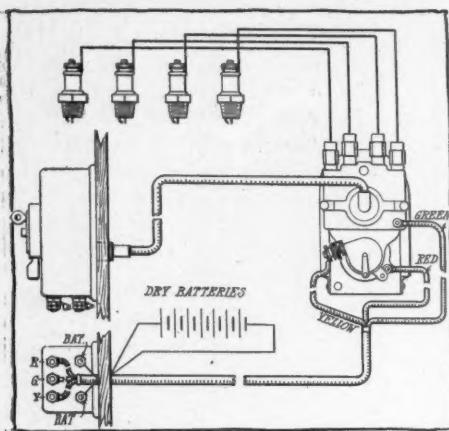


FIG. 6—CONNECTIONS OF REMY COIL

phere. Absolute pressure is found by adding 14.7 pounds to the gauge pressure.

KNIGHT ENGINE COMPARISONS

Chase, Kan.—Editor, Motor Age—As the Silent-Knight is coming into use in the United States to a considerable extent, and granting its claim of silence and increased power over the poppet valve engine, it occurs to us that a comparison of the two types say with a 4 by 5 inch cylinder would give the average reader a better idea of merit.

1—What would be the difference in weight of the two engines of dimensions above?

2—Both being designed as near perfect as possible, how would they compare as to economy in the use of gasoline and water?

3—Has the Knight engine ever taken any part in a contest such as the Vanderbilt cup race or a reliability run in a contest with other cars within the United States or elsewhere other than the trial by the R. A. C. of England? If so, what was their comparative standing?—F. Willard.

1—All would depend upon the design and construction of the two engines. If two ordinary motors were used for the comparison, the weights would most probably be the same. The weight of the valve chambers, valves and valve-operating mechanisms of the poppet-valve motor most probably would be just about the same as the weight of the sleeves, sleeve-operating mechanisms, and the extra weight of the heavier construction of the entire sleeve-valve motor required to withstand the strains of the 25 or 30 per cent greater horsepower claimed.

2—No official comparative tests have been made, so that authentic information on this question is hard to obtain; but from the tests that have been made on the Knight motor, it is reasonable to believe that it would make a very favorable showing.

3—In the fifth annual reliability trials, held in the summer of 1909 under the auspices of the Scottish Automobile Club, there were sixty-five starters, out of which fifty-eight finished. The trials, which consisted of a combined reliability and econ-

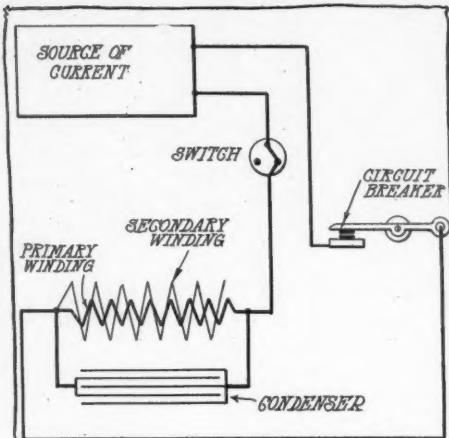


FIG. 7—SPARK COIL CIRCUIT

omy test, included three hill-climbs and a brake test, lasted 6 days and covered a distance of over 1,007 miles, in stages averaging 170 miles per day at a scheduled speed of not less than 17 miles per hour and not more than 20 miles per hour. The entries were divided into eight classes according to price and the winner in each class was awarded a gold medal, while bronze medals were awarded each class having the best hill-climbing results. The Scottish cup was awarded to a 38-horsepower Minerva car equipped with a Knight engine. This car also received a bronze medal. No official tests of the Knight motor in its present stage of development are recorded.

FASTEAST PISTON TRAVEL

Chicago, Ill.—Editor Motor Age—Kindly favor me with answers to the following questions:

1—What part of the stroke does the piston travel the fastest?

2—What part of a wheel, wagon, motor car or locomotive, travels forward fastest?—M. Rix.

1—The piston travels fastest at the middle of the stroke and is at a dead stop at each end of the stroke.

2—With relation to the car all parts of the rim travel at the same rate of speed, but with reference to the road surface, or stationary objects the upper part of the rim travels the fastest while the lower part travels the slowest. The upper part of the rim is carried forward at a rate which is a combination of its own rotated speed and that of the car as a whole, while the lower part is carried forward at a speed which is the difference between the two.

ACTION OF DISCO DISTRIBUTER

Hagerstown, Ind.—Editor Motor Age—Please advise me through the Readers' Clearing House if in the Disco self-starter the lever on the dash acts as a pump or just opens the valves between the acetylene tank and the engine cylinders.—Mark Allen.

The rotation of the lever in the dash simply opens small valves to each cylinder in order and allows the gas to flow into the cylinders under the tank pressure.

Outlines Ideal Car

Missourian Suggests Convertible Body With Radiator Behind the Motor

KANSAS CITY, Mo.—Editor Motor Age—I herewith submit my idea of an ideal car equipment for a gasoline pleasure car. A berline body which becomes an open touring car by removing the windows, and does not require a longer wheel base than the shortest touring made today, and seats comfortably one more passenger, all facing forward if desired. Oil and fuel tank to be in convenient location and engine as accessible as in its present location. The radiator in front of the driver's seat should act as a ventilator, to be closed at will, being 30 inches long. The cooling would be much improved, and the top of the engine box would make an ideal baggage-storing place. The body being suspended between the axles would give easy riding qualities, and if there was any objection to the differential housing being 6 inches off center, it could be overcome by connecting the transmission to the engine by silent chain in an oil-tight case without difficulty.—Lekin.

DEFINES ELECTRIC AGITATOR

New Orleans, La.—Editor Motor Age—In my last article I mentioned an electric agitator and accelerator for the carburetor. I want to elucidate what was meant by agitator and its application. Its primary purpose would be to supply gas for self-starting from the source whence it should properly come, thus eliminating all those new-fangled auxiliary appliances for self-starting.

The base of power is derived through the carburetor and why it should not be provided with an attachment to supply gas under compression to start the engine is an inexcusable defect of the present article. There should be sufficient energy from a storage and dry battery to a very small agitator in the shape of a centrifugal wheel, blower or developer of some kind, to force gas through the intake pipe into the cylinders and thus render starting easy, quick, direct and positive. Why should some foreign device be employed when the very essence of power for self-starting is so easily available?

If an attachment to the carburetor direct is not feasible, what prevents an electric-driven pump connected by a bypass to the intake pipe automatically closing and opening same, to be started and stopped by a switch on the dash? The pump can be driven by a very small electric motor supplied with energy from a storage battery or dry cells.

By either of these attachments compressed gas also can be furnished to the cylinders while the engine is running, thus increasing its power and efficiency.—Charles Roth.

Air Starter Systems

Chalmers and Winton Devices Described for Ohio Reader— Adjusting Valves

NEY, O.—Editor Motor Age—I would be pleased to have Motor Age answer a few questions through the Readers' Clearing House.

1—What size air tank would be about right for a 30-horsepower air-starting motor?

2—Please illustrate and explain the self-starting system used on the Winton?

3—How can I quiet the clicking sound of the valves on an Everitt 30 motor?

4—What size tires would you suggest for use on a 2,500-pound car?

5—How can I remedy a Splitdorf magneto to make easy starting on magneto?—L. D. Sweet.

1—The Chalmers 36-horsepower car now employs a cylindrical air tank 8 inches in diameter and 54 inches long; the company contemplates fitting the same system and tank to the 30-horsepower car.

2—The self-starting system of the Winton car was very thoroughly illustrated and described in the January 5, 1912, issue of Motor Age, page 60. It is of the pneumatic type, as it uses the exhaust gases of the motor, allowing them to be stored up in a tank during the exhaust stroke. Attached to the two middle cylinders of the engine are outlets through which a small portion of the exhaust gases pass to a pressure tank carried between the left frame rail and the driving shaft. The gases are forced into the tank upon the exhaust stroke of the motor.

Two ball valves in the pipe line between the cylinders and the tank prevent the escape of gases back to the cylinder from the tank when not wanted. The storing up of pressure in the tank is automatic, the operation stopping when the tank is full and commencing again when the pressure has been reduced below normal. Another pipe leads from the tank to a gauge and button valve on the dash, and from there is led to a distributor on the cam-shaft of the motor. When this button is pushed the compressed gas flows through the distributor to one of the cylinders which is ready to commence the power stroke. The air tank of the Winton car is $6\frac{1}{4}$ inches in diameter and 34 inches long.

3—The clicking sound of the valves on your Everitt 30 car no doubt is due to too much space between the end of the valve tappets or stems and the pushrods. Generally, this space should amount to between $1/64$ and $1/32$ inch. Of course the smaller the space the less noise, but sufficient space must be allowed for elongation of the valve stem due to expansion when the motor becomes warm, and for irregularities in the shape of the cam or roller.

It often happens that one or two of the valve tappets of a motor may be

greatly in need of adjustment, whereas the others are in comparatively good shape; in such cases there is a decided clicking sound at regular intervals when the motor is in operation. For locating the clicking valves in cases of this kind, a simple tool made of brass, such as is shown at B and C, Fig. 8, may be used to advantage.

To adjust a valve pushrod, crank the motor over slowly until the piston of the cylinder having the valve to be adjusted is about half way up on its compression stroke, at which time both valves of that cylinder should be tightly closed. In the absence of a gauge for regulating the space between the valve stem and tappet, a common business card may be used as shown in Fig. 8. The card C is folded once and slipped between the ends of the stem and tappet, the lock nut N is loosened, and the stud S is screwed up or outward until it just begins to pinch the card and prevents it from sliding about as readily as at first. The card then is removed and the lock nut tightened. If, after adjusting the valves, the motor should show a loss of power when it became warmed up, stop the motor and try the compression while the motor is warm by cranking it slowly by hand.

4—Tires $3\frac{1}{2}$ inches in diameter are considered most practicable for a car weighing about 2,500 pounds.

5—Providing the magnets are not weak, one has but to see that the compression in the motor cylinders is good and the ignition spark properly timed, then advance the spark control lever about three-quarters the length of its travel and briskly crank the motor over the point of maximum compression.

FLUX FOR CAST IRON

DeWitt, Ark.—Editor Motor Age—Will Motor Age please answer the following questions through the Readers' Clearing House:

1—Is there any flux that can be used to solder the water-jacket of a cast iron engine cylinder?

2—I am going to build a garage large enough to accommodate about five cars, and have a repair department in the rear. I want the driveway on one side so the cars can be stored on the opposite side.

What should be the dimensions of such a building?—J. M. Lowe.

1—A flux which can be used to solder the water-jacket of a cast iron cylinder is cut muriatic acid, that is, hydrochloric acid in which zinc has been dissolved. For tinning, use four parts of salammoniac solution in water and one part of hot hydrochloric acid. The action can be improved somewhat by sprinkling a little powdered salammoniac on the surface.

2—The dimensions of the garage building will depend entirely upon the size of the repair department you intend to have. You can probably get a good idea of the general dimensions from the fact that a space of about 30 by 30 feet should be allowed for the cars.

NO FORMULA FOR RADIATOR

Masontown, Pa.—Editor Motor Age—Please advise through the Readers' Clearing House how the formula is based for computing the piston displacement and also the radiator cooling surface necessary for any four-cylinder motor.—Reader.

The rule for finding the piston displacement of a motor cylinder is that of finding the cubic contents of a cylinder, which is as follows: Multiply the area of one end by the length of the cylinder, the product will be the cubic contents of the cylinder. The rule for finding the area of a circle, consists in multiplying the square of the diameter by .7854. The formula for finding piston displacement is: $D^2 \cdot 7854 \cdot S \cdot N =$ Piston displacement, in which D is the diameter of the cylinder, S length of stroke, N number of cylinders.

Therefore, to find the piston displacement of a motor with 5-inch bore, 6-inch stroke, and four cylinders, substituting the numbers for the letters of the formula, it would read: $5^2 \cdot 7854 \cdot 6 \cdot 4 = 471.2$ cubic inches.

There is no formula for finding the radiator cooling surface necessary for any four-cylinder motor that is applicable to all types and makes of motors or radiators. This is because of the great variation in the cooling efficiency of the various designs of motors and radiators made. Each radiator maker, however, will be able to very closely approximate the amount of surface of its own design most suitable for any particular motor.

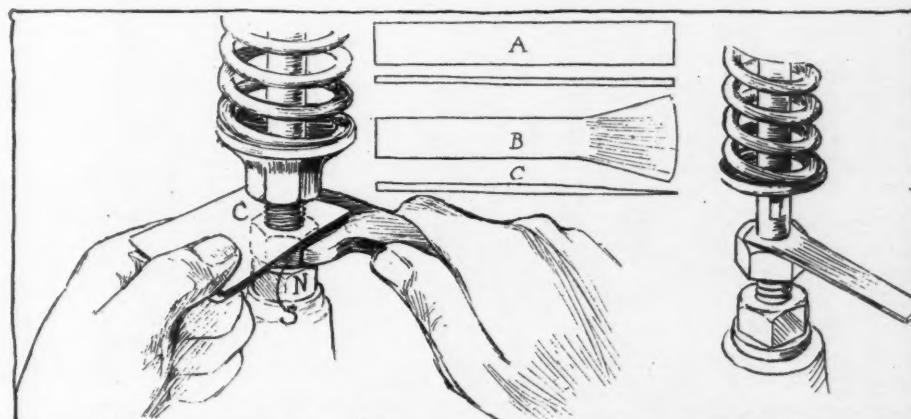


FIG. 8—METHOD OF LOCATING AND ADJUSTING NOISY VALVES

Standard Motor Constructions Improved

A VERY large percentage of the motor cars produced in America today, is equipped with standard design of motors, made by concerns that specialize in the construction of this important unit. There are a number of concerns making these motors; and in this, the first half of a serial on standard motor constructions, engine designs to be found on many 1912 motor cars are described and illustrated.

There has been a number of marked improvements made in motors of this character during the past year; and several departures in the way of rotary and slide-valve designs have been introduced.

New Power Plants Show Increased Accessibility, Simplicity, Durability and More Smooth and Silent Operation—Combination of Prime Mover, Clutch and Gearset Very Popular

By George Gaidzik
Part I

Among the improvements to be found in most of these motors might be mentioned increased accessibility, simplicity, durability; and more smooth and silent operation. These improvements have been brought about through the use of improved ma-

chinery and manufacturing processes, more careful workmanship, and some slight changes in design. Valve-operating mechanisms have been inclosed and rendered adjustable; better facilities have been provided for the attachment of ignition devices; and considerable refinement is to be found in the cooling and lubricating.

Practically all motor makers produce unit power plants. The combination of motor and transmission gearset as one unit, completely inclosed, is becoming most popular; this construction embodies many features which are advantageous to both the manufacturer in building, and the buyer. It allows for the inclosing of the clutch, and eliminates the necessity of a universal joint between the clutch and gearset. It also renders all working parts dust-proof; facilitates lubrication; and eliminates a number of parts which in the other construction are absolutely necessary.

Another notable feature is the increased popularity of the six-cylinder motor. This is indicated by the addition of one or two six-cylinder models, to the lines of practically all of the larger standard motor manufacturers.

The Rutenber Motors

The Western Motor Co., Marion, Ind., makes the Rutenber motors, and in addition to the three models that comprised the line for 1911, three new styles have been added so that the company is fur-

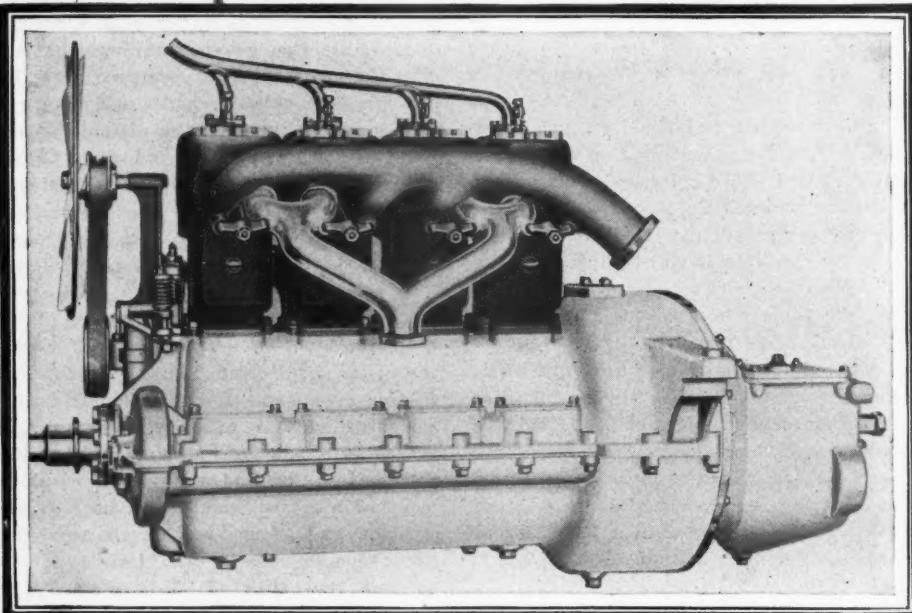


FIG. 1—A NEW RUTENBER UNIT POWER PLANT

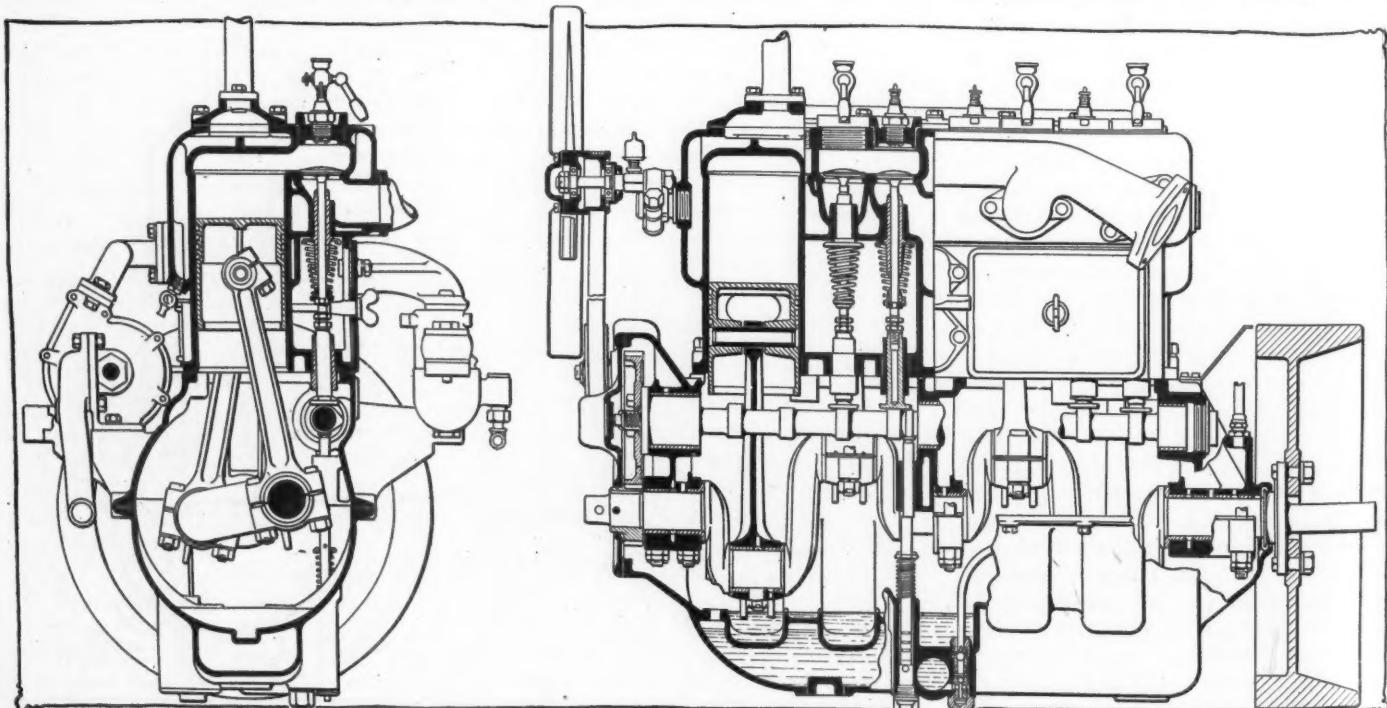


FIG. 2—END AND SIDE SECTIONAL VIEWS OF A CONTINENTAL MOTOR

General Features of Engines for 1912

Non-Poppet Valves Are on Trial With Parts Makers—Six-Cylinder Models Increasing in Popularity—Changes and Refinements Described and Illustrated—Several New Models

nishing six for the season of 1912, as shown in the following table:

Model	No. of Cylinders	How Cylinders are Cast	Bore	Stroke	Valves with $\frac{1}{8}$ -Inch Lift
W	4	Separately	4	4	$1\frac{1}{4}$
RA	4	Separately	$4\frac{1}{2}$	4	2
U	4	Separately	$4\frac{1}{4}$	4	$2\frac{1}{8}$
NEW MODELS					
X	4	Separately	$4\frac{1}{2}$	$5\frac{1}{4}$	2
Y	6	Separately	$4\frac{1}{2}$	$5\frac{1}{4}$	2
27	4	Block	$3\frac{1}{4}$	$5\frac{1}{4}$	$1\frac{1}{4}$

The new models X and Y are similar in design and construction except that the Y has six cylinders and the X four, all of which are cast separately, as has been characteristic of Rutenber design up to the present year.

These models differ from models W, RA and U, in a number of ways: The water pump is of a centrifugal type instead of gear. Three-point suspension instead of four-point is employed, the front end of the motor being designed for a single flexible trunnion support. Valves are inclosed. A starting crank is fitted as regular equipment.

Both the camshaft and crankshaft are in the same horizontal plane and can be removed or adjusted from below after the lower portion of the crankcase has been taken down. Valve pushrods are lifted by clever roller and lever combinations, Fig. 6, which are mounted in pairs and readily removable as units.

Fans are provided with a spring support for maintaining proper tension on the belt. Water manifolds have brazed joints. The magneto is driven from a shaft that drives and pierces the water pump, so that the intermittent strains of the magneto shaft are not transmitted to the gears. And the flywheel is designed for attachment of either a cone or multiple-disk clutch. A general idea of

the design may be obtained from Fig. 1.

The new model 27 motor is a radical departure from Rutenber design. It is a short compact motor of long stroke type, with cylinder case in one block and with valves inclosed. It has an aluminum crankcase divided horizontally at the center and adapted for three-point suspension, and it has a three-bearing crank-shaft of exceptionally large diameter.

With the exception of the differences previously mentioned, all Rutenber models except 27 are almost identical in design and construction. Cylinders are of the L-type, with integrally cast water-

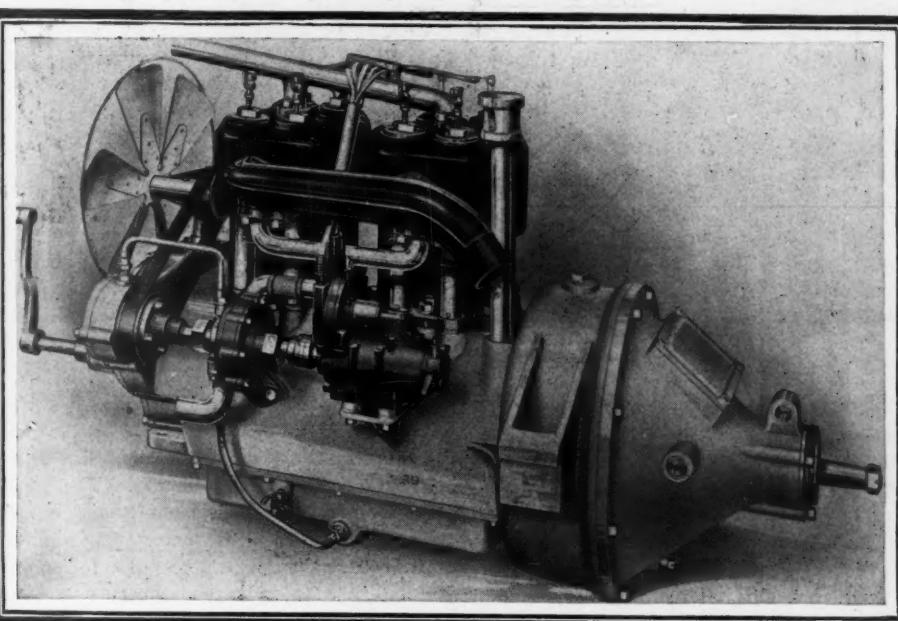


FIG. 3—UNIT POWER PLANT MADE BY WÄRNER MFG. CO.

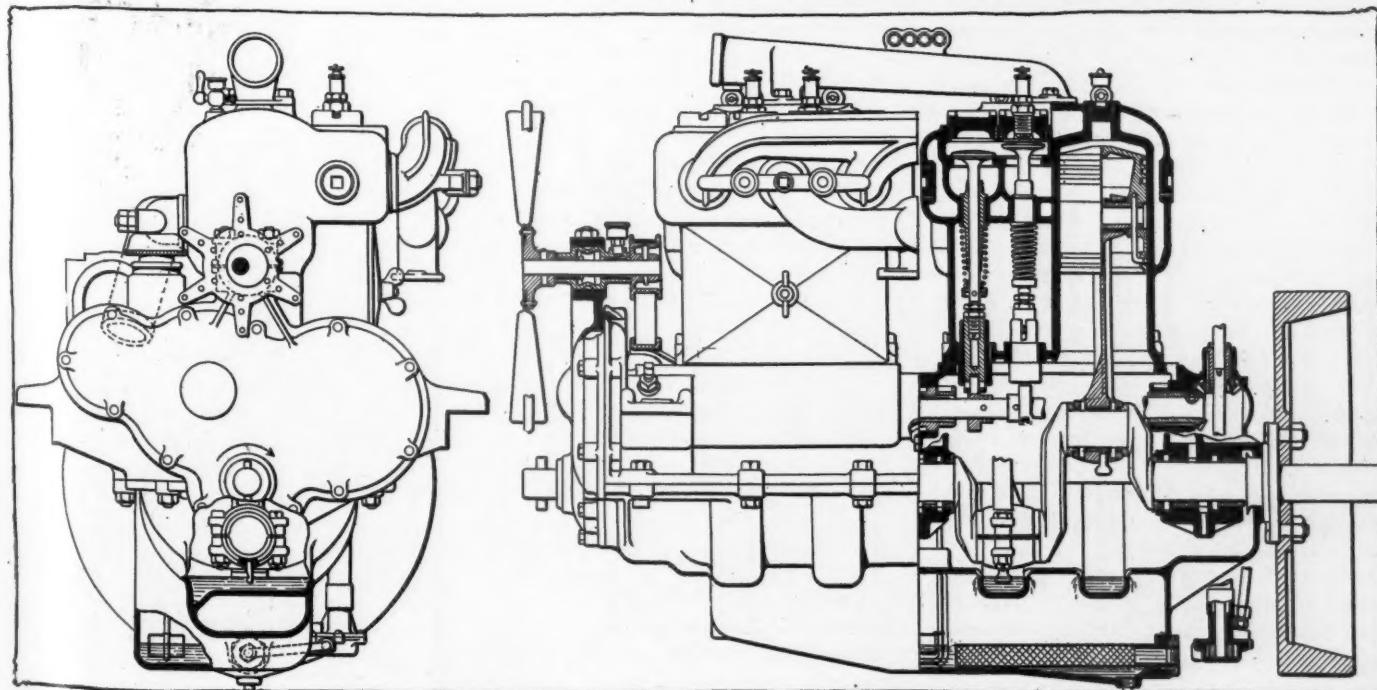


FIG. 4—END AND SIDE SECTIONAL VIEWS OF A BEAVER ENGINE

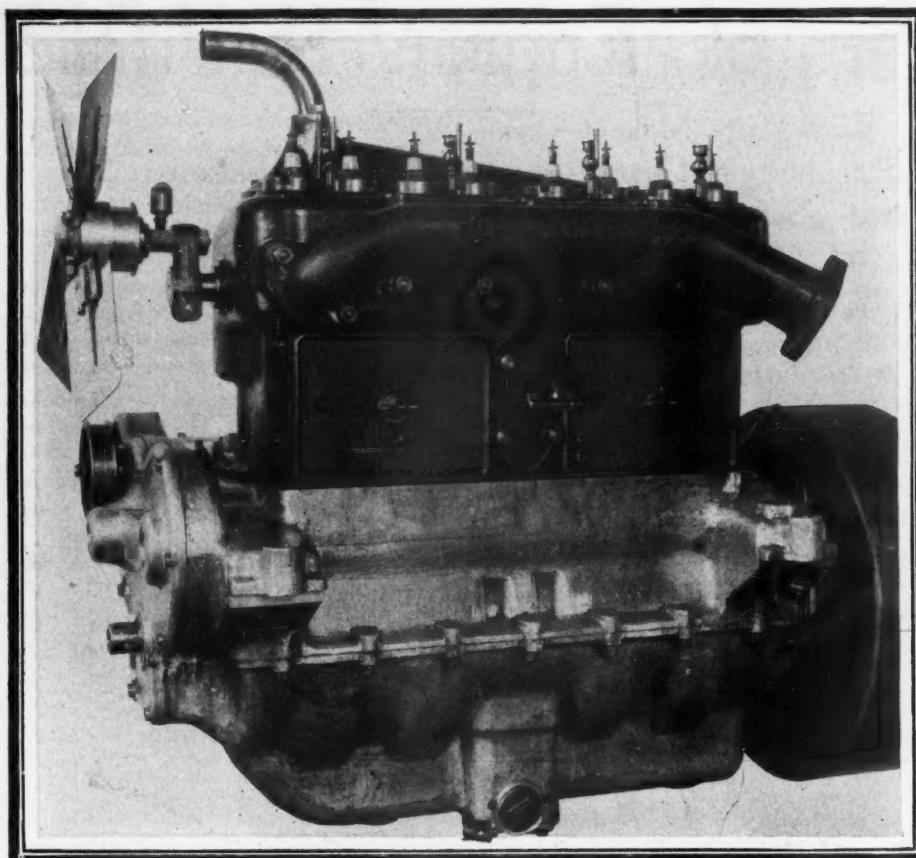


FIG. 5—LEFT SIDE OF A CONTINENTAL MOTOR

jackets and valve chambers. Pistons are cast of the same materials as the cylinders and undergo the same treatment both in testing, machining and inspection. Piston rings have square lap joints; and are four to a piston, three above the pin and one opposite the pin, so as to prevent it from working out and scoring the cylinder. Piston pins are made from seamless steel tubing, which is hardened and ground; and the piston-pin bushings are made from phosphor bronze, pressed into the pistons and reamed.

Connecting rods are drop forgings and of exceptional length to reduce side wall thrust and wear at the pins. The upper end is split and the pin is held in position by a clamping bolt, lock washer and lock nuts.

Bearings for connecting rods and crankshaft are made from die-cast babbitt metal, and are split horizontally. Five of these bearings support the crankshaft in the upper half of the crankcase.

The cams are forged integrally with the camshaft, which is mounted on three cast bronze bearings; these, too, are split horizontally to permit of adjustment. The camshaft gear is cast of semi-steel, and meshes with a drop forged gear on the crankshaft; both have helical or spirally cut teeth to assure quietness, smooth running and long life.

A circulating oiling system is employed which is quite clearly shown in part in Fig. 11. The lower portion of the crankcase is itself divided horizontally into two compartments, an oil reser-

voir below and splash chambers above. As illustrated, oil is drawn from the oil-reservoir R by the gear pump P, which is surrounded by a strainer. The pump forces oil through the lead L and out of the holes H onto the connecting-rod and crankshaft bearings. A float F is provided in a separate chamber, and a vertical rod with a ball-indicator I at the top of it, is furnished to show the level of the lubricant in the reservoir.

New Continental Six

Owing to the demand that has been created for a short, compact and accessible six-cylinder motor, the Continental Motor Mfg. Co., Muskegon, Mich., has brought out a new model which is designated 6C. This motor is furnished in two sizes, as shown in the following table, and either as a unit power plant or independent motor.

CONTINENTAL LINE FOR 1912

Model	No. of Cylinders	Type	How Cast	Bore	Stroke	Valves	$\frac{5}{8}$ -Inch Lift
R	4	L	Pairs	$4\frac{1}{4}$	$4\frac{1}{2}$	$1\frac{3}{4}$	
J	4	L	Pairs	$5\frac{5}{8}$	$5\frac{1}{4}$	$1\frac{1}{2}$	
T	4	T	Pairs	$5\frac{1}{4}$	$5\frac{1}{4}$	$2\frac{1}{4}$	
T	4	T	Pairs	$4\frac{1}{2}$	$5\frac{1}{2}$	$2\frac{1}{8}$	
E	4	L	Pairs	$4\frac{1}{2}$	$5\frac{1}{4}$	2	
C	4	L	Block	$4\frac{1}{8}$	$5\frac{1}{4}$	2	
C	4	L	Block	$3\frac{3}{4}$	$5\frac{1}{4}$	2	
C	6	L	Threes	$4\frac{1}{8}$	$5\frac{1}{4}$	2	
C	6	L	Threes	$3\frac{3}{4}$	$5\frac{1}{4}$	2	

Three-point suspension, cylinders cast in threes, the use of a three-bearing crankshaft, and inclosed valves, are features of the new six-cylinder model C motors; and the small overall dimension

of the motors renders them adaptable to a 40-inch hood.

Having the inlet gas passages cored inside each cylinder casting allows the use of a simple Y-shaped intake manifold and avoids the unequal firing often found in manifolds of more complicated design. The use of only three main bearings for the crankshaft makes this motor approximately the same in construction as the ordinary four-cylinder motor; and it is claimed that the six-cylinder motors are lighter per horsepower than the fours, for outside of the extra cylinders, pistons and valve parts, the total number of parts are exactly the same as on the four-cylinder motors. The crankcase is of aluminum, is divided horizontally, and bearings are adjustably secured to the upper portion.

The valve mechanisms are inclosed by two metal plates, each one being held in place by a winged nut. These covers, which are easily removable, tend to quiet the tappet actions and also protect the valve mechanism from all dirt and dust.

Either a thermo-syphon or pump water circulating system can be furnished. In the latter a large centrifugal pump is employed which forces the water into the jackets directly under the valves.

In the lubrication system two positive plunger pumps operated by camshaft eccentrics on either side of the middle camshaft bearing, force oil under pressure to the timing gears and bearings. This oil drains back into the splash section, which is divided by walls into four separate compartments. These walls naturally keep the oil from running to either

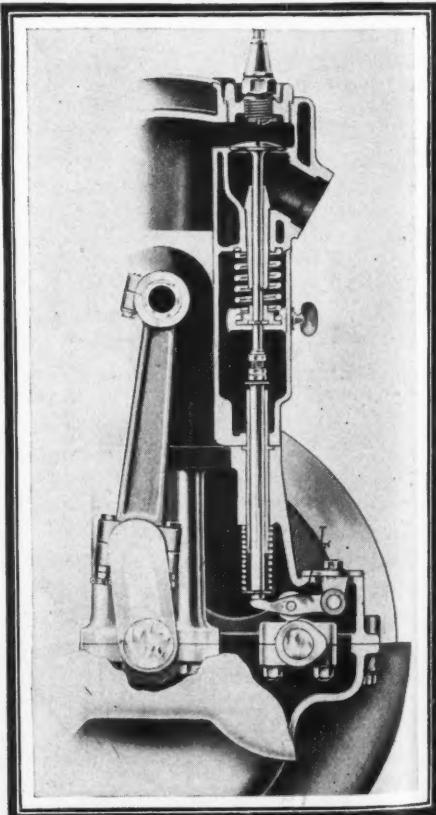


FIG. 6—NEW RUTENBER VALVE-LIFTERS

end of the motor when on grades. Dippers on the connecting rods splash oil into the cylinders. A constant level is maintained in the splash section, and the overflow returns to the reservoir to be filtered and recirculated as in Fig. 13.

When these motors are furnished as complete unit power plants, a raybestos-faced multiple disk clutch and three-speed selective sliding gearset are fitted whose mechanisms are compactly arranged and thoroughly encased.

Three Northway Models

Northway unit power plants comprising a four-cylinder water-cooled L-type motor, a leather-faced cone clutch and a selective sliding transmission gearset are the features of the Northway line of 1912. These are, with a few exceptions, almost identical in design and made in three sizes having the following dimensions:

Model	No. of Cyls.	Bore	Stroke	Valves
15	4	4	4	1 5/8
19	4	4 1/8	4 1/4	1 3/4
26	4	4 1/2	5 1/4	2

Though there is a marked structural similarity of all three sizes of the Northway motors, a close comparison will show a few characteristic differences. The model 19 and 26 motors are identical in design, but the transmission gearset of the model 26 is equipped with ball bearings throughout; while the countershaft of model 19 is mounted on plain white metal bearings. Model 15 has a transmission gearset similar to model 19, but the motor design differs in that the crankcase is divided horizontally and contains a circulating oiling system; while models 19 and 26 have barrel-type crankcases and non-circulating force-feed splash oiling systems. Another difference is that the model 15 motor has mushroom valve lifters, and the other motors have a roller to 60 horsepower, as follows:

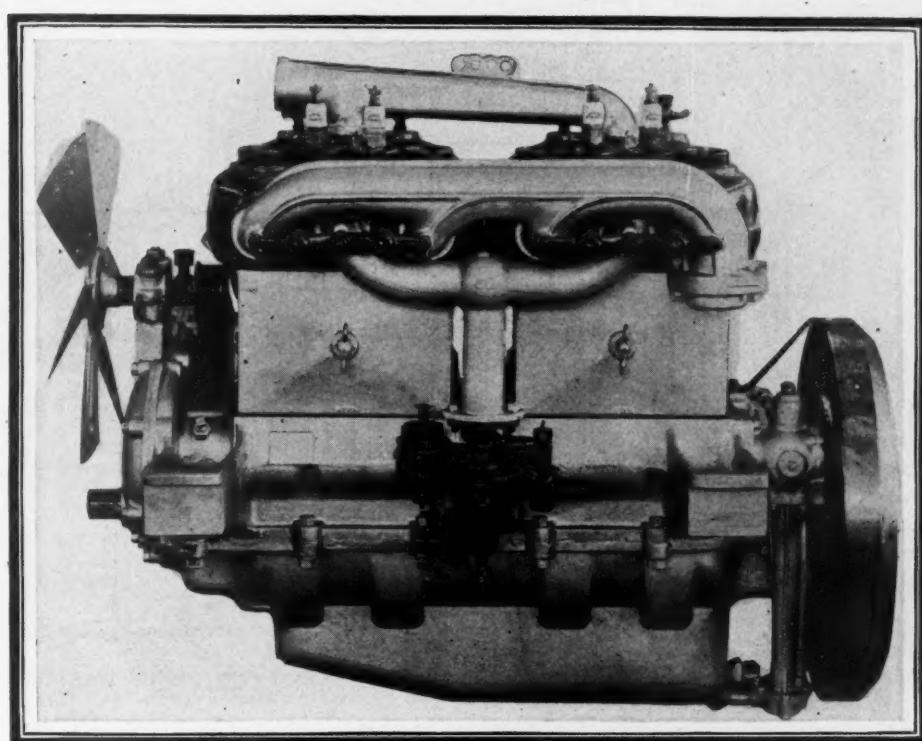


FIG. 7—LEFT SIDE OF A 1912 BEAVER ENGINE

design. The general design of the Northway motors is very clearly shown in Fig. 8, and a complete and thoroughly illustrated description of the Northway Unit power plants was published in the last December 28 issue of Motor Age.

New Wisconsin Motor

A new four-cylinder, T-type, long-stroke motor with the cylinders cast in pairs has been added to the Wisconsin Motor Mfg. Co.'s line for 1912. This increases the product of this Milwaukee concern to five models, ranging from 28

WISCONSIN MOTORS FOR 1912

Model	No. of Cylinders	Type	How Cast	Bore	Stroke	Valves
A	4	T	Pairs	4 1/4	5 1/2	2 1/2
B	4	T	Pairs	4 1/4	5 1/2	2 1/2
B	6	T	Pairs	4 1/4	5 1/2	2 1/2
C	4	L	Block	3 3/4	7	1 1/4
NEW MODEL						
O	4	T	Pairs	5 1/4	7	2 1/2

A general idea of Wisconsin motor design may be obtained from the sectional view of the model C shown in Fig. 10. Cylinders and pistons are made of the same quality of cast iron and are pickled

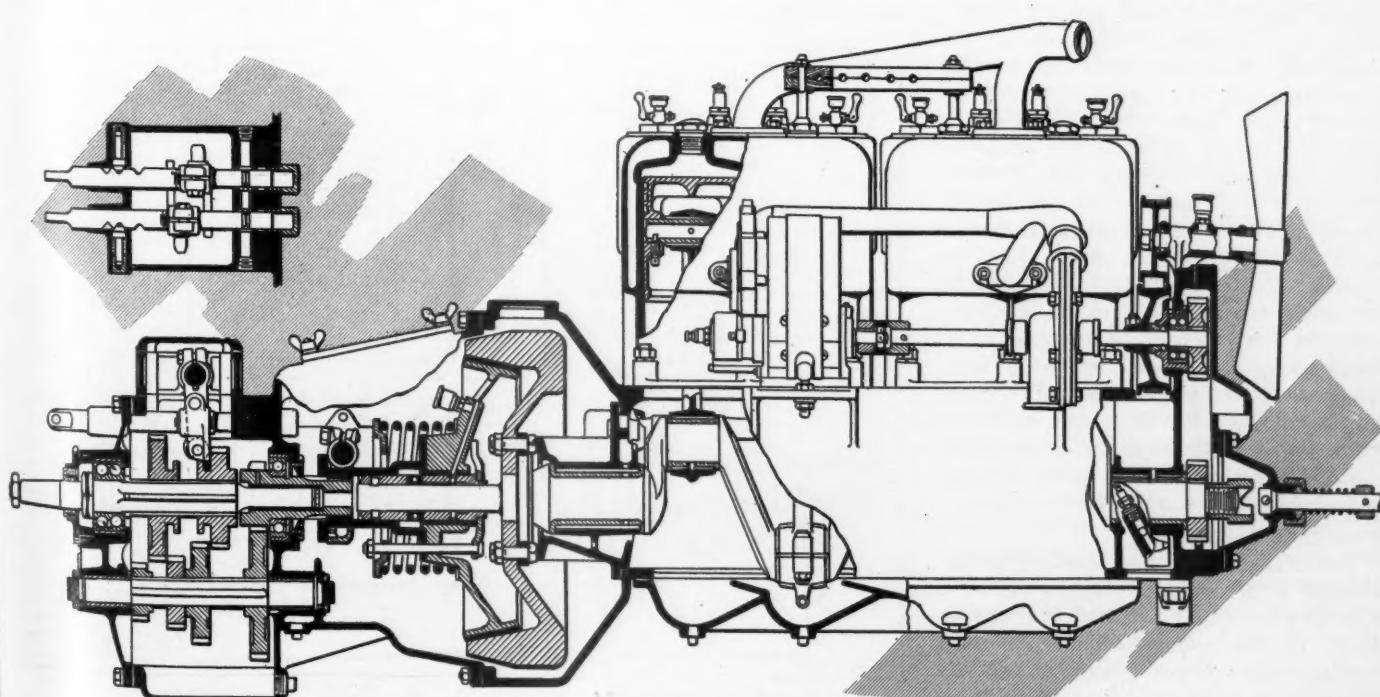


FIG. 8—SIDE SECTIONAL VIEW OF A NORTHWAY UNIT POWER PLANT

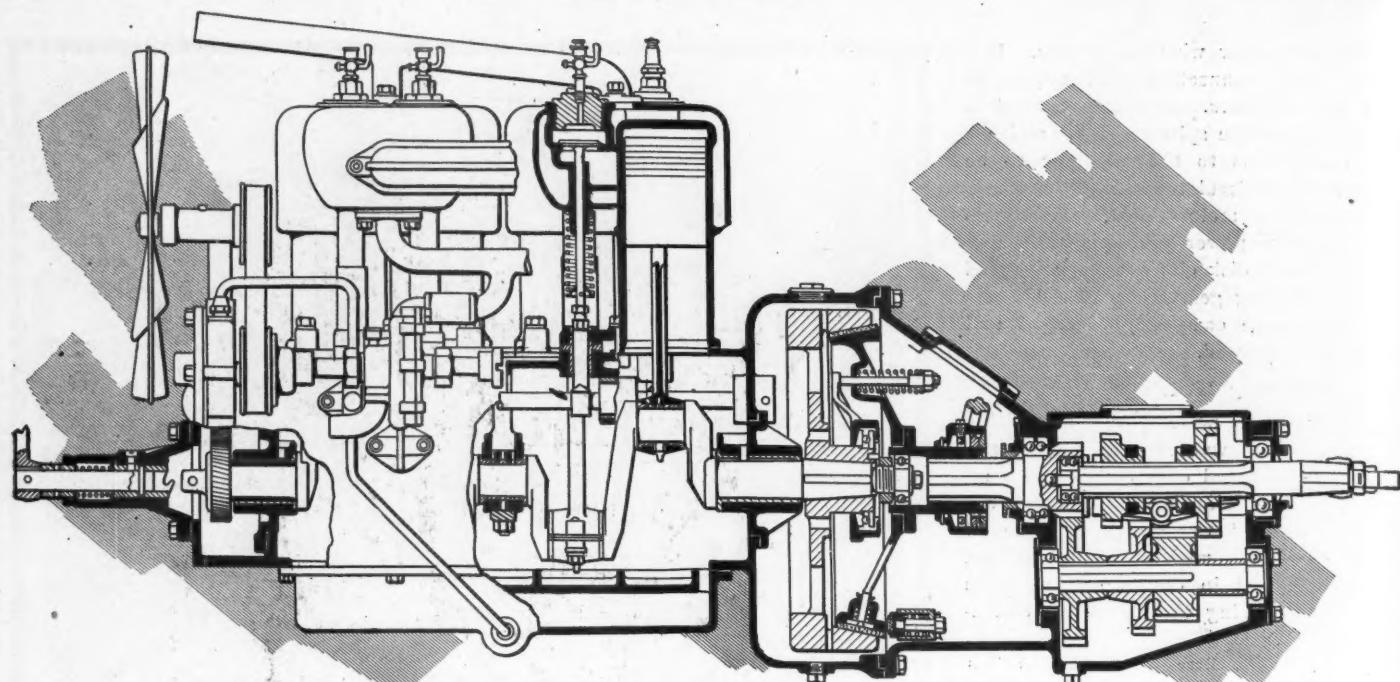


FIG. 9—SHOWING CONSTRUCTION AND DETAILS OF WARNER UNIT POWER PLANT

before being machined. They are carefully turned and ground to size, and the pistons are slightly tapered toward the heads, being .003 smaller on the head end to allow for expansion. Each piston is fitted with four rings of semi-steel; and each is provided with four oil grooves below the pin, and a wide groove cut in line with the pin which collects the oil and leads it to the piston pin bearings. The wrist pin is of hollow tool-steel ground and hardened, and is fastened to the connecting-rod by means of a bolt.

Connecting rods are I-beam section drop-forgings, fitted with babbitt-lined bronze bushings on the crankshaft end of the truck motors, and Parson's white bronze on the others. Crankshafts are especially large and rigid; and the fly-wheel flange is forged integral. Camshafts run in large bronze bearings, are removable from the front end of the crankcase, and the cams are keyed and pinned to the shaft in all motors except the block model, in which the cams are forged integrally with the shaft. Push-rods and valve springs are entirely inclosed by an aluminum housing that is split in the center and held in place by a spring that permits of its being readily removed. On the block motor the push-rods are of the mushroom type, and valve mechanisms are covered by band plates. The valves have cast iron heads welded to steel stems on the D motor, and electrically-welded nickel heads on the other models. Helical timing gears are employed which have wide faced teeth.

Crankcase Design

The crankcases are of cast aluminum, strongly reinforced by cross ribs; and are divided horizontally, with all bearings secured to the upper portion. The supporting arms are cast integrally with the crankcase in all models except type D, on

which the arms are made of cast steel and rigidly bolted to the crankcase.

A circulating lubricating system is employed in these motors. Oil is pumped by means of a gear pump located on the outside of the crankcase and driven by spiral gears from the camshaft. As shown in Fig. 12, it is forced to a main duct cast integral with the case and from there distributed through ducts cast in the webs to the main bearings. From the bearings it passes through a hollow crankshaft to the connecting-rod bearings. A fine wire gauze is brazed to the opening of the oil pump to prevent dirt from being carried into the bearings. A sufficient amount of oil is thrown off from the connecting rods to thoroughly oil the pistons and camshaft. An oil gauge is provided with a float indicator to show

the level maintained in the reservoir.

Either a gear or centrifugal water pump is furnished in all models except the type C, which has a thermo-syphon system; and ball-bearing belt-driven fans are fitted which are mounted on supports attached to the crankcase.

Provision is made for two sets of spark plugs, and convenient attachment of any type of magneto.

Warner Unit Power Plant

The No. 200 unit power plant is one of the features of the Warner Mfg. Co.'s line for 1912. The motor of this outfit, which is made in Toledo, is a four-cylinder four-cycle T-type with cylinders cast in pairs. It has a bore of 3½ inches and a stroke of 4½ inches; and the valve openings are 1½ inches. A cooling system with forced water circulation, a circula-

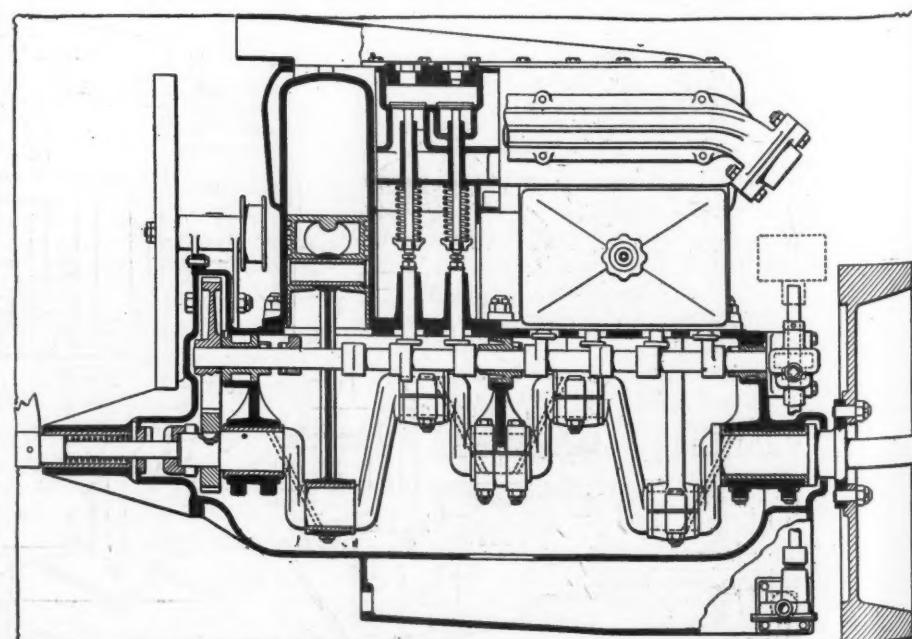


FIG. 10—SIDE SECTIONAL VIEW OF WISCONSIN BLOCK MOTOR

ing oiling system, inclosed valves, and three-point suspension are other features of the motor. The clutch is a cone type; and the gearset a selective sliding gear design giving three forward speeds and reverse.

Bearings are Die Cast

Crankshaft and connecting-rod bearings are die-cast. Cams and camshafts are integral, with large bearings placed close to the cams. The flywheel is secured to the crankshaft by means of a slow taper and fitted key, and it is provided with tapped holes for attachment of a puller. The crankcase, transmission and clutch housing, and clutch cone, all are of cast aluminum.

Lubrication of the motor is by splash entirely, with a constant level maintained by an oil pump operated by number one exhaust cam. On account of the small size of the cylinders and to eliminate complication the outfit is arranged to start and run on the magneto alone.

In the cooling system water is circulated by a centrifugal pump mounted on the magneto driving shaft, and this shaft is driven by a gear in mesh with the spiral camshaft gear. These gears are mounted at the front end of the crankcase in an oil-tight housing. Circulating oil passes over these gears and is drained back into the crankcase by an overflow which is high enough to allow the teeth of the crankshaft gear to be partially immersed in oil at all times. The valve springs are enclosed in dust-proof telescoping cases which are readily opened to adjust the lifters, and these lifters are very simple and accessible.

The clutch is faced with Lineobestos and is provided with six spring-operated plungers under the facing to facilitate engagement. The ball thrust bearings are inclosed in cups packed with lubricant,

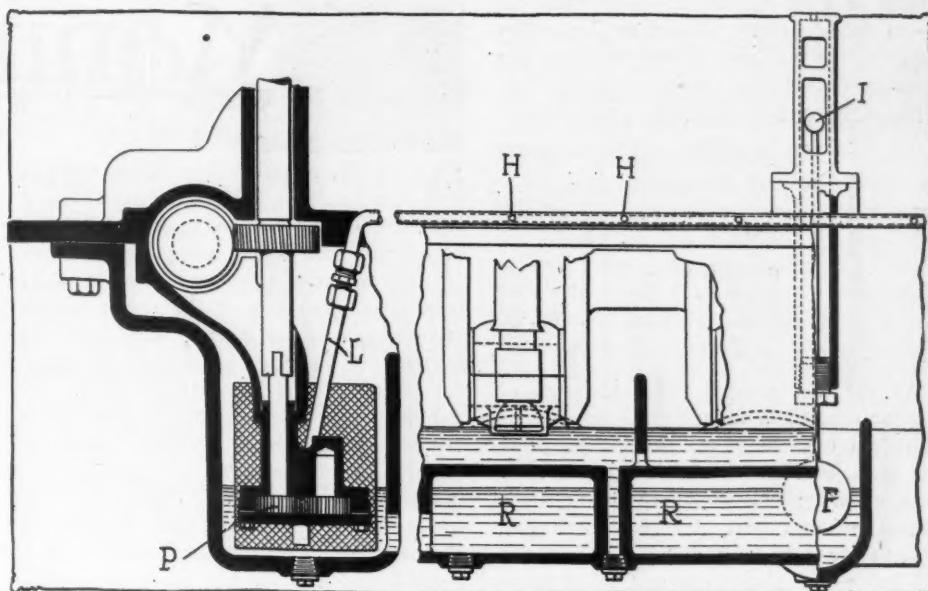


FIG. 11—RUTENBER OILING SYSTEM IN DETAIL

The gear oil pump P draws the lubricant from the reservoir R, and forces it up through the lead L and out of holes H onto connecting rod and crankshaft bearings, and into splash basins under rods. The overflow from splash basins returns to reservoir. The float F indicates level by means of the ball indicator I on the end of rod attached to float

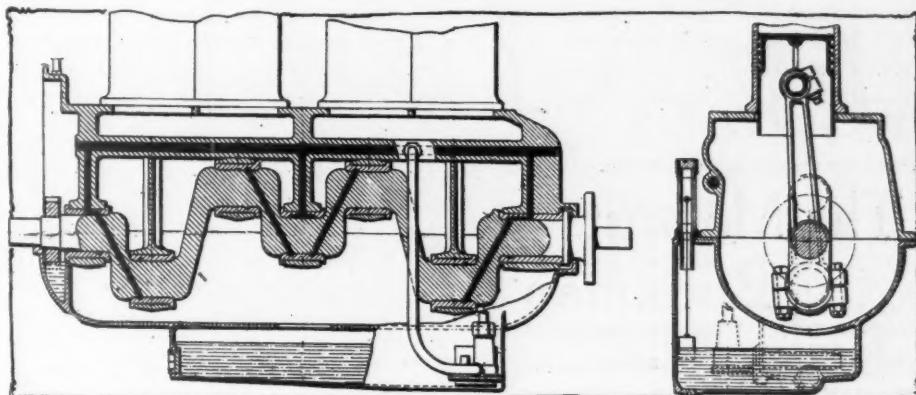


FIG. 12—SHOWING COURSE OF OIL IN WISCONSIN MOTOR

and the forward end of the clutch is supported by an imported annular bearing

mounted on the crankshaft. A fiber-faced plunger brake is provided to prevent spinning of the clutch when disengaged and thereby facilitate gear-changing. The motor is furnished with clutch only, if desired.

The transmission gearset is equipped with imported ball bearings on the countershaft and at the rear of the main shaft, and with double-row New Departure ball bearings at the main-shaft gear and pocket bearing.

The Beaver Engines

The Beaver Mfg. Co., Milwaukee, Wis., now enters upon its eighth successful season of motor manufacture, and its line comprises eighteen different models, including six of the two-cylinder opposed type of 15, 18 and 20 horsepower; one four-cylinder block type of 20-25 horsepower; seven four-cylinder models ranging from 30 to 50 horsepower; four six-cylinder models of from 40 to 60 horsepower, and unit power plants in which some of these motors are incorporated.

One of the features of the Beaver line is the block type. Details of design and construction of this motor is very clearly

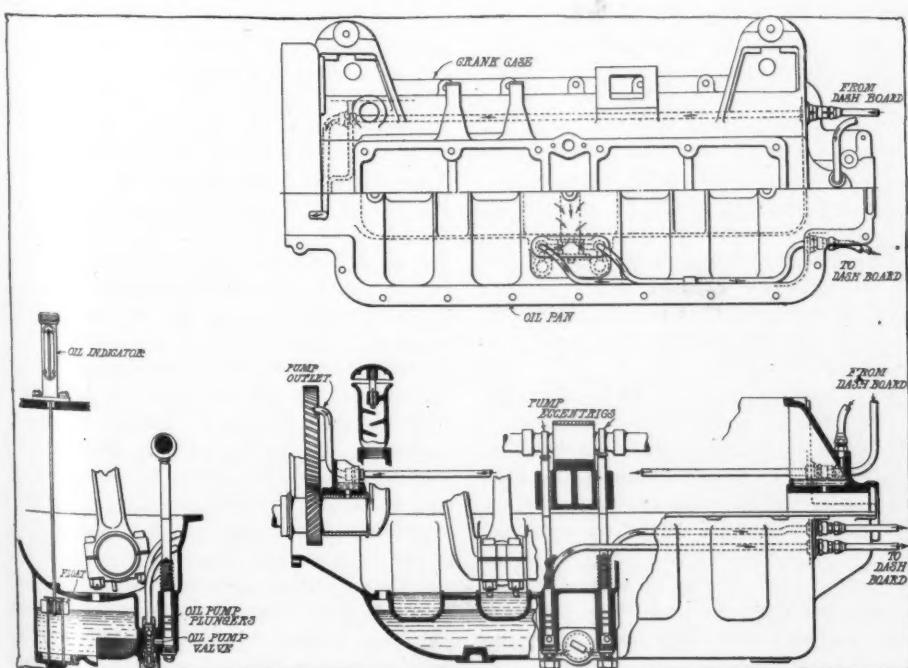


FIG. 13—DETAILS OF OILING SYSTEM IN CONTINENTAL MOTORS

shown in Figs. 4 and 7. This motor is up to date in every respect and embodies many of the features characteristic of the most advanced engineering practice.

FEATURES OF BEAVER LINE FOR 1912

Model	No. of Cylinders	Type	How Cast	Bore	Stroke	Valves
UB	2	L	Separately	4 $\frac{1}{4}$	4	1 $\frac{1}{2}$
XLV	4	L	Pairs	4 $\frac{1}{4}$	5 $\frac{1}{4}$	1 $\frac{1}{2}$
4H	4	L	Pairs	3 $\frac{1}{2}$	5	1 $\frac{1}{2}$
4A	4	L	Pairs	3 $\frac{1}{2}$	5	1 $\frac{1}{2}$
6A	6	L	Pairs	3 $\frac{1}{2}$	5	1 $\frac{1}{2}$
F6	6	L	Pairs	4 $\frac{1}{4}$	5 $\frac{1}{4}$	1 $\frac{1}{2}$

As for the general characteristics of Beaver design, in all motors having their cylinders cast in pairs, the intake ports for each pair of cylinders have one common opening; whilst there is an individual exhaust port for each cylinder. Pistons are very long, and oil grooves are cut below the piston pin and relief holes are provided for surplus oil. Three eccentric rings with butt joints are used.

Connecting rods are drop-forged and have adjustable die-cast nickel bronze split bushings at their lower ends which are shimmed in place. The flywheel flange is forged integral with the crank-shaft. Cams are forged integral with the cam-shaft. And all operating gears are of steel helical type.

The Motorists' Bookman

First Principles of Aeronautics

PROBABLY no science has advanced as rapidly as in so short a time aroused a popular interest as has the science of aeronautics since a motor which could be used in airships was evolved. Because of this rapidity of development, as yet but a small amount of literature on the subject has been brought out. But to the many who maintain an interest in the subject beyond attending an aeronautic meet and viewing what to the mind untutored in the principles of dynamic flight appears a marvel, two small volumes on the elementary principles of this new science will be welcome.

A. P. Thurston in "Elementary Aeronautics," treats of Planes, Stability, Propellers, Designing a Flying Machine, Aeronautical Engines, etc. The volume contains 126 illustrations and a very complete index. It is published by The Macmillan Co., New York. Price, \$1.25 net.

"The Aeroplane," by T. O. B. Hubbard, J. H. Ledebauer and C. C. Turner, deals with the Properties of the Air, Relations of the Plane and the Air, Theory of the Aeroplane, Propulsion, Motors, etc., with appended bibliography, glossary and tables, is illustrated by five plates and thirty-five diagrams. Published by Longmans, Green & Co., London, England.

Manufacturers'

VALVE ADJUSTMENT

DETROIT, Mich.—Editor Motor Age—It is my opinion that a fair proportion of gas engine trouble arises from a failure to accord to minor details, a negligence which is not necessarily wilful, but is due, rather, to ignorance of the real function of each particular part and of the importance of keeping the same in condition for it to perform its duty properly. To reduce the up-keep to the minimum and insure safe motoring, it is advisable to be always on the alert for possible derangements, thoroughly inspecting the mechanism as frequently as is convenient. No eccentricity of action should be neglected and the trouble must be traced to its source and remedied immediately. I do not wish to convey the impression that the average car requires continual inspection, but I do believe that an odd $\frac{1}{2}$ hour spent now and then in cleaning and tuning up, even though the machine is giving perfect satisfaction, is productive of both pleasure and profit to the owner. He is amply repaid for the time and trouble by the improved action of his engine and the man imbued with the spirit of the true motorist derives a pleasure from adjusting and understanding the power plant of his car, which is second only to the joy of driving it. All of which brings us to the question of valve-grinding and adjustment. If the average car owner only realized the importance of keeping all valves properly seated!

A great many car owners make a practice of adjusting valves while the motor is hot. This is a grievous error. It is proper to note any abnormal condition like this which develops but advisable to wait until the engine is cold before making any changes. If this suggestion is not heeded, particularly with motors of overhead valve design, the adjustment will be inaccurate, valves will not seat properly, resulting in weak compression and the entire action of the engine will be impaired on account of trying to correct one fault by committing another.

An adjustment too tight on intake valve or too loose on exhaust valve permits the fuel to escape, thus reducing the compression and diminishing the power of the explosion stroke.

An adjustment too loose on intake valve also reduces the compression by shortening the length of the compression stroke. The exhaust valve under loose adjustment opens late. This retards the engine action as the exploded gases do not have prompt exit and a portion of the power intended for compression stroke is wasted in recompressing dead fuel, which would have been expelled had the exhaust valve opened soon enough.

Bear in mind these remarks are con-

fined to one cylinder only. When one remembers there are four cylinders, each requiring equal exactitude of adjustment to keep the valves of one cylinder from crossing or overlapping those of another, the importance of doing the work right is emphasized. That is one of the reasons why an engine throbs and lurches and misses and backfires and lays down on a hill; improper valve adjustment nine times out of ten. This leads up to the point of valve-grinding.

Too much emphasis cannot be placed on the necessity of examining the valves carefully at regular intervals, even though the compression is apparently normal and uniform in each cylinder. The exhaust valves are especially susceptible to corrosion on account of the intense heat of the escaping gases. The seats soon become pitted, the carbon dust and vapor is caught and confined in every little crev-

Canadian Industry

Fourteen Car Factories in Dominion—Output in 1911

1200 Machines

TORONTO, March 2—There are now fourteen motor car factories in Canada and the output for 1911 exceeded 1,200 cars. In 1905 there were only some 500 cars owned in Canada. Today there are upwards of 16,000 owned in the province of Ontario alone. Most of the cars used in Canada are imported from the United States. All but two or three of the factories in this country bring in most of the parts and assemble them here, but the aim of the larger concerns is to build the complete car here. Then there will be a more generally satisfactory class of car for general use in Canada, as the manufacturers will give more attention to the specifications of a car adapted for the varying conditions of the dominion.

The pioneer in this direction is the Hardinge Motor Car Co., of Newmarket, Ont., near Toronto, which is building a runabout for 1912 having a road clearance of 10 inches. It will require years to effect a very considerable change in the highways of Canada and until then the motorist must be prepared to encounter frequent stretches of abominable roadway in whatever direction his car is headed.

Nearly half of the cars made in Canada last year were shipped to Australia, and it is said that the most popular car used in that country is Canadian made. A few cars of Canadian manufacture go to the United States, but these are sold only to expatriated Canadians, who have not yet been weaned away from their native admiration for Canada and made-in-Canada products.

Communications

ice and in an incredibly short space of time the valves, if neglected, will be covered with a deposit of carbon which will affect the running of the motor to a marked degree. The only remedy is to grind them.

There are several good grinding compounds on the market. It is advisable to use a coarse grade in the first operation and then finish off with a finer one to impart a nicely polished surface. A very good home-made mixture is obtained by making a thin paste of a couple of teaspoonfuls of kerosene, a few drops of oil and enough fine flour emery to thicken the preparation to a consistency where it will not run too freely.

Remember even the minutest particle of this grinding abrasive must be kept from finding its way into the combustion chambers. Pack a good, generous quantity of waste or rags well soaked in gasoline

around the valve seat and take due precaution to leave the inside of the cylinder casting perfectly clean.

Apply a moderate coating of the compound to the bevel face of the valve and return it to its seat. Next rotate the valve forward and back until the entire bearing surfaces are polished bright and smooth and the full width of the face. If the guide is worn or the stem bent great care must be exercised or the valve will not be true, that is, the bevel face will not be flat but a trifle convex. The valve never should be turned the whole way round. Oscillate it back and forth a quarter turn at most under light pressure, lifting it up frequently and turning it half way round before seating it again. This method distributes the friction evenly and eliminates the possibility of the emery scoring the bearings. If no valve-grinding tool is available. I would recommend the use of a carpenter's bit stock as a much smoother movement is obtained than by using a screw driver.

After working up a good clean seat entirely free from spots or pits wash the valve, valve seat and guide thoroughly in gasoline. If the stem is rough or gummy, smooth it up with emery cloth but clean it afterwards before replacing it in the guide. To test the effectiveness of the work, mark the valve seat in several places with a lead pencil and turn the valve around a few times. If the marks are entirely rubbed off, the work may be considered well done. Abbott Motor Co., T. A. Peck, manager technical department.

ON RETREADING TIRES

Akron, O.—Editor Motor Age—Those who have complained through the Readers' Clearing House department of Motor Age that the results from retreaded and repaired casings are not what they should be, we believe are well justified in making the statements which have recently attracted our attention; for it is true that the average repair job, specimens of which frequently come to our notice, bears little relation, either in appearance or durability, to the finished product of the factory repair department.

Within the past 2 or 3 years numberless tire repair shops and vulcanizing establishments have been opened throughout the country, and this in many places has brought about the closest kind of competition. The result is that cheap materials often are used, and, to secure a sufficient amount of business, the operators in many cases will undertake to repair tires that can not and will not give paying service after the work is done. This, together with the incompetence of a great many repairmen, who have perhaps served only

2 or 3 months' apprenticeship in learning their trade, accounts for the major portion of retreaded-tire failures and consequent lack of confidence on the part of tire users in work of this kind.

All large consumers of tires, such as taxicab and livery companies, are continually having casings repaired, retreaded and relined, some even having shops of their own, and would not think of discarding a tire simply because of a blow-out or the tread being worn through. Then, too, the tire manufacturers maintain repair departments at the factories and principal branches, all of which, in our opinion, are evidences that under the right conditions it is economy to have tires repaired and that retreading does pay. In the factory department of this company hundreds, yes thousands, of tires have been treated in the past few years, and we have yet to hear from a single customer who is dissatisfied with the service he received.

But what, then, is the remedy for the evils we have mentioned? The answer can be given in one sentence: Seek out a competent repair man, one who charges for and does use good materials, and above all, one who will not attempt the work unless the tires are good enough to warrant the expense.—Swinehart Tire and Rubber Co., L. J. Schott.

Motor Car Literature

GOOD roads is the slogan of the motorist, and as one of the means to better roads, the Solvay Process Co., Syracuse, N. Y., has issued an attractive booklet dealing with its Solvay granulated calcium chloride, for use as a road binder and dust layer. The illustrations feature various roads in different parts of the country where this road binder has been used, while the text goes into the characteristics and efficiency of the material.

Bulletin No. 112 from the Sprague Electric Co., New York, deals with its electric dynamometers for gas engine manufacture. A general description of the dynamometer is given, followed with an explanation of the measurement of horsepower, and operation. The bulletin is well illustrated.

The stillness, solitude and desolation of the desert is vividly portrayed on the front cover page of the booklet entitled "The Trail of the Lonesome Truck," by W. T. Fishleigh, and is the story of the coast-to-coast journey of a 3-ton Packard truck. The booklet is artistically arranged and a map included.

Information of interest to tire users is contained in a booklet entitled "Minor Repairs and the Care of Tires" just issued by the Firestone Tire and Rubber Co.

Saskatchewan Trucks

Motor Freighting Is Popular in the Vicinity of Moose Jaw—

Freight Rates Cause

TORONTO, March 2—N. R. McRoberts, of Moose Jaw, Sask., who is associated with his brother in the ownership and operation of three large ranches in the province of Saskatchewan, passed through Toronto last week on his way to Florida. Mr. McRoberts was the first man in Moose Jaw to utilize a motor car for commercial purposes.

"I was driven to it," he said, "by the excessive express and freight rates charged by the railroads. I must admit that I have not saved any money by taking the bull by the horns, but I have had a whole lot of satisfaction in dodging exorbitant rates and have had a lot of most delightful experience in running here and there over the prairie country, which, in our section, is suitable for motoring between 9 and 10 months in the year. Our roads are mere trails, but they are not bad and in sparsely settled districts one can cut corners and shoot prairie chickens and wild ducks and have a glorious time with a ton of supplies on the car for the ranch.

"In 2 years from now, I venture to assert that there will be a thousand commercial cars owned by the ranchers of western Canada where now there are twenty. There were only 5 weeks all last winter during which my car was unavailable on account of snow. The motor car is the solution of the excessive transportation problem of the great west, and there are thousands of men out there who think as I do and have the money to gratify their desire to be independent of the railroads and express companies."

The Realm of the



Every Motor Truck Running a Missionary

EVERY motor truck now running is preaching efficiency facts as important to the industry and to humanity as the actual work it is accomplishing.

With every industry in which the motor truck is being tried out there are hundreds of problems to be solved. The truck is fast being adopted by many main lines of business, but before it will fit other lines the business must be adapted to the truck. Every machine running, in solving these problems, is working out solutions and pointing the way for other trucks to follow, teaching lessons which will enable the following generation of motor delivery vehicles to enter and be a success in lines where now their use is impossible as a financial proposition.

When motor trucks first were built the designers combined all their wagon experience with their motor car experience, changing each to fit the new demands. The result was surprisingly good, and the machines made in the early days of the industry still are at work, many of them. They were at first adopted by firms such as breweries, which had heavy loads to haul for fairly long distances, with few long stops. Here the truck was a success almost from the start. With the use of the machines the manufacturers found out mechanical weaknesses and the business firms found others. These changes were made and the number of firms which could make a truck pay was enlarged so that other industries, satisfied as to the mechanical side of the motor vehicle, took on trucks and added more experience. There were many firms that could make a truck pay and are yet, and trucks continued to be sold and to develop until of late we have awakened to the importance of service in connection with the mere vehicle, so that now there is a new development going on.

Lessons That Are Taught

The second stage of development is with us, and, starting with the old horse system ideas as a basis and with a vague knowledge of what the truck will do, based on largely the statements of volatile dealers and agents, we have started in the use of a motor vehicle delivery service. Already a number of lessons have been taught to business by the missionary trucks now in operation, and more facts are being driven home every day by their use. In buy-

Power Wagon Teaches a Lesson in Each Industry in Which It Gains a Substantial Footing

ing power wagons the merchant has been demanding to know, and rightly, just what his truck would cost him in actual service, what his fuel items would be, this was easy and merely a matter of figuring from experience, what his deterioration would amount to, and most firms figure this very generously, what his driver would cost, the number of packages he could carry, etc., etc. Then he wanted to know just what mileage the truck would make.

Here was a real question, and on its answer depended the success or failure of the motor vehicle as a transportation unit.

Demonstrations Urged

"Try it and see," says the agent, and a demonstrator is put into service. Here is a real missionary truck spreading good gasoline gospel and on whose work depends the salvation of many a delivery and business problem. If traffic conditions and receiving conditions are right the truck can be made to pay almost anywhere, for the loading part is well within the hands of the merchant using it. If these conditions are not right there will be a consequent falling off of efficiency,

even so far as to make the truck in its first test, say, a failure.

As in cases which have been mentioned previously in Motor Age, there may be conditions entirely too big for one dealer to handle, the fault of city government, or lack of knowledge of traffic difficulties, or improper receiving arrangements involving great loss of time in unloading, all of which are beyond the truck user to remedy. This missionary truck, however, has taught him that these things are there to be remedied and that when they are taken care of he can save money in his line of business, so that if any measure ever comes up to better conditions he is one unit of a movement which can move things. This same truck has impressed on the agent, too, the difficulties in his way that a little control will remedy, and he, with his fellows, will get together and see that something is done so that they can sell more trucks. Thus, the failure of this one truck in one demonstration will do more real good in the end than if it had been a huge success, and in its seeming death plant a seed which shall grow into really big things for that industry in which it originally failed. The line of delivery which first realizes that it needs reorganization to fit the new conditions will be the line which will most benefit from the motor truck, and when



SINGLE-CYLINDER DE DION USED IN FARMING WORK

Commercial Car

Truck Guarantee Discussed by S. A. E.

one starts others will follow. This only will come, however, after repeated failures of trucks in a line which demands their use on account of some other condition. Just what the circumstances will be is impossible to foretell.

Speed Up or Fail

As trucks have been used, all allied lines of effort have been of necessity forced to speed up or fail. If a driver failed to fit his energies to the new vehicle he has dropped out and a more energetic and better paid man has taken his place; if a shipping clerk has failed to see what the truck was and how it should be used, treating it carelessly merely as a unit of his horse system, he has found that it is a case of "make good or quit," and has had to speed up his force and system accordingly. If loading by hand was too slow, better systems were demanded, and the quickest unloading devices, when short hauls were necessary, brought into use; a survival of the fittest, as it were.

So let's boost the missionary trucks, watch their work, figure results carefully and learn more especially causes for failures that we may be able to correct those things which hold back the day when our streets shall belong to the motor vehicle.

And there shall be no noise there!

Metropolitan Section Believes Time Will Eliminate Necessity of the Service Promise

FOLLOWING the election of Joseph A. Anglada as chairman, A. J. Slade as treasurer and J. C. Chase as secretary of the metropolitan section of the Society of Automobile Engineers for the ensuing year, two topics of live interest were brought up for discussion last Friday night in New York. The first of these was the subject of service guarantees for commercial vehicles. There seemed to be considerable difference of opinion as to what should constitute a guarantee. For the most part, the discussion was from the manufacturers' standpoint, only one member touching on the topic from the point of view of the truck buyer.

It seemed to be quite generally held that the demand for service guarantees from reputable makers will fade gradually as the industry assumes more and more of a solid basis. There is no service guarantee imposed upon the maker of other classes of machinery, and Mr. Slade's view that it seems unbusinesslike to exact a guarantee from the maker as to results when he has no further control

of the product was held also by a number of the others in attendance.

The largest users of commercials do not demand guarantees from the makers. Examples of this class are the express companies and the big commercial houses. They investigate the proposition thoroughly before they place their order, and that ends it. There should, however, be a guarantee as to defective material and design over a period of years, in the opinion of several of the members, and any reputable truck maker is willing to give such a guarantee.

Some of those present disagreed with this as to material and design, they believing that the latitude is too great, and that it would not be fair to come back at the manufacturer after 2 or 3 years just because during that time he has made improvements. It also was stated that the maintenance guarantee is a commercial one and should be given if the purchaser desires it. The cost of the vehicle under such a contract, however, would be greater. Each case of sale is an individual one, and there should be no hard and fast rules as to what should be done in any case. They depend on the conditions.

The matter was looked at from the angle of the sales department, and all agreed that the salesmen and the engineers who have designed the product should be at one as to what the machine can and will do. The intending purchaser oftentimes is more apprehensive as to the car's meeting the claims which have been made for it by the salesman than he is as to its mechanical construction. It was the belief that all the salesmen of any organization should be supplied with real figures, as there is danger to the industry in overestimating truck performance in comparison with horses.

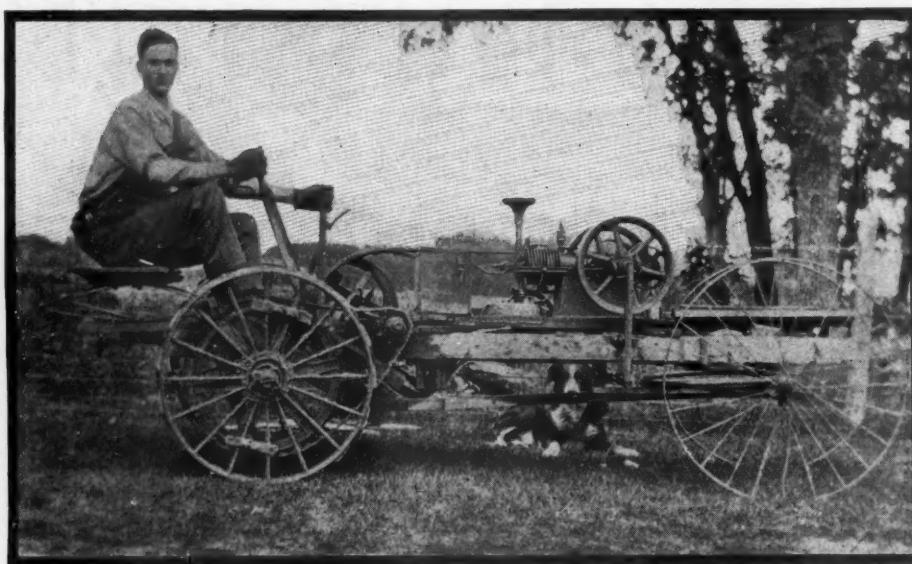
Several rather unusual forms of service guarantees were brought up and discussed, after which the subject of carbonization in motor cylinders was taken up.

Forrest A. Heath was the principal speaker on this topic, he explaining very fully the reasons for carbonization in cylinders. The principal source of carbon deposition, he said, was in the improper chemical combination of the hydrogen and oxygen in the combustible mixture.



POWER FURNISHED FARMER BY ONE-CYLINDER DE DION

Minnesota Farmer Makes Own Tractor



AIR-COOLED SINGLE-CYLINDER USED IN TRACTION WORK

AN air-cooled gasoline traction engine is shown in the accompanying illustration as built at Glenville, Minn., by Charles A. Gillard. It is driven by a single-cylinder 1-horsepower motor which is cooled by a fan on the left side of the cylinder running at a very high speed so there is no danger of overheating the engine.

The motor is of the four-cycle type, runs at a speed varying from 200 to 700 revolutions per minute. The tractor engine has two pulleys, one on the main shaft 6 inches in diameter, the other located on a reduction gear, which runs one-sixth as fast as the crankshaft. This is used for slow-motion machinery, as for driving the separator, churn, fanning mill and grindstone.

It is stated that the rear wheels of the tractor are taken from a mower, and the front wheels are from an old go-cart. This tractor is 16 feet long and it weighs over 900 pounds. A friction clutch was placed on the large wheel belted to the engine, which works perfectly, starting the tractor up slowly without any jerk, and it is said that one can move the tractor an inch if desired by controlling the left lever. The friction clutch was made out of two pieces of 2 by 2 material, the length being of the diameter of the

large wheel. A collar was put on with a set screw so it would be solid on the shaft. These two pieces were bolted on the collar and two pieces of wood the shape of the wheel, about 12 inches long, were used for the slides and bolted one slide to each end with a piece of leather on each to make it slide easily in the large wheel. When tightened up the slides would hold so well that it would brake the clutch before they would let go. The engine is regulated by a throttling governor which was designed to regulate the engine at any speed of from 200 revolutions per minute to 700 revolutions per minute. This throttling governor is seen next to the right flywheel of the engine. It will be noted that the tractor is steered by the right lever, which is connected to the left side of the front axle by a rod so when the lever is pulled it turned to the right, and when it is pushed it turned to the left. The tractor travels about 6 miles an hour and will climb steep hills without difficulty. The engine is used for pumping water and running the fanning mill and grindstone as well as the churn. It also is used for grinding feed, sawing wood and running the washing machine, the same motor being utilized for driving the separator and hauling wood.

To secure the correct chemical union, the two elements must be evenly diffused through the air, and when this is not the case, large globules coke out into chunks which deposit on the cylinder heads and valves. This is due largely to the way throttles are handled, since for slow speeds all carburetors have to be adjusted more richly than they should be. This excess material must separate out.

Inasmuch as several who were well in-

formed on the subject who had been asked to attend the meeting and enlighten the members as to carbon prevention, were not on hand, very little of value was brought out on this phase.

TRUCK TEST DELAYED

The practical road test of motor trucks, which is being conducted from Washington, D. C., to Fort Benjamin Harrison, Ind., under the observation of Captain Alexander E. Williams, is not progressing as rapidly as was expected by that of-

ficer. Captain Williams anticipated that he would accomplish his 1,300-mile run with four trucks in about 3 weeks, which would enable him to reach his destination about this time; instead of which he was at last accounts received by the war department, at Greensboro, N. C., having encountered frozen roads in Virginia and sticky mud roads in North Carolina. In many places the wheels sank in the mud to the axles. One of the four trucks with which Captain Williams started has been returned to the factory for repairs. On 1 day Captain Williams and his fleet made a trip of 96 miles, this being between Richmond and Roanoke Rapids, N. C.; the next day he made 62 miles. This is considered an excellent showing with loaded trucks.

NEW YORK FACES TAXICAB PROBLEM

New York city is considering the problem of allowing a continuance of the present practice of private taxicab stands on the public streets. The matter is in the hands of a special aldermanic committee which has been instructed to investigate the whole subject with the idea of affording a reasonable basis for a new ordinance covering the subject.

The rights and wrongs of the present status present a problem of much complexity, even the taxicab companies themselves being uncertain as to whether the existing arrangement is correct or otherwise, or if it should develop that it were right; whether or not it is advantageous from the viewpoint of the companies.

From time to time there have appeared articles in the metropolitan press showing what vast sums have been spent for exclusive stand privilege, indicating that the cost to the companies is considerable and naturally such cost must be borne in the final analysis by the patrons of the service.

SOUTH BEND OPENS BIDS

Fifteen bids were received by the board of safety for a car to be used by the chief of the fire department, of South Bend, Ind. The specifications require that the machine be at least 24 horsepower and that it carry two chemical tanks, a ladder and be equipped with a running board.

CHICAGO GETS FIRE ENGINE

Chicago has just received its first motor fire engine, one of a shipment of three being built for the Windy City by the Nott Fire Engine Co. In reality the machine is but a motored chassis for a steam fire engine, for the gasoline motor has nothing to do with the pumping of water, but is used merely to propel the vehicle.

On its first test in Chicago's streets the roaring attracted a large crowd, and, according to the daily press, alarmed the management of Powers' theater, nearby, which feared its audience would think there was a real fire near by. The engine complete weighs 9 tons, and is capable of a speed of 35 miles an hour. Its final test for the city will take place this week.

Horse vs. Truck—Cost of Operation

STUDYING the cost of operation of horse-drawn teams and motor trucks, the Velie company figures that whereas it is possible to operate a two-horse team somewhat cheaper than a 3-ton Velie truck, that the comparison greatly enhances the value of the motor truck for business purposes because the latter will give more service than two and one-half teams. It is figured that the cost of operating a 3-ton Velie truck 45 miles a day for 313 days is \$11.61 a day, whereas the two-horse team costs \$11.35 a day, averaging only 14 miles a day. In addition one must consider the saving of time in loading and unloading, figuring that one truck replaces two and one-half teams.

Deductions drawn by the experts who did the figuring for the Velie company are interesting. Discussing first the motor truck, the experts make the following statement:

We present herewith an estimate of cost of operating a Velie 3-ton truck, which estimate has been compared with many actual operating expenses as per 3-ton trucks, or trucks of our capacity in the hands of users in operation for more than 1 year. We wish to call special attention to the liberal allowance for depreciation—the fact that we charge the truck off at the end of 7 years. A liberal mileage rate per day which, of course, would be in favor of the truck if not operated the given number of miles.

Cost, \$3,500, with body—6 per cent
interest per annum equals.....\$ 210.00
Fire insurance, floater type..... 96.25
Garage, \$20 per month equals per annum..... 240.00
Driver, 50 weeks, \$20 per week..... 1,000.00
Liability and collision insurance per annum..... 125.00

Making a total fixed expense per annum..... \$1,671.25 or at a total rate would equal \$5.35 per day as a fixed expense.
Yearly depreciation from original cost..... \$500.00
Painting per annum..... 75.00
Repairs, replacements and overhaul..... 300.00

Total per annum..... \$875.00
Forty-five miles per day, 313 days per year, equals 14,085 miles per annum
at \$875 cost would equal per mile..... \$0.062
One set of tires, 8,000 miles, \$438.11,
equals per mile..... .054
Gasoline at 10 cents per gallon, 5 miles to the gallon..... .02
Oil, 200 miles 1 gallon, 40 cents, equals per mile..... .002
Grease, 1,000 miles, 60 cents per gallon, per mile..... .0006
Transmission oil, 60 cents per gallon, per mile..... .0006

Cost per mile, 45 miles per day, 313 days per year..... \$0.1392
Fixed expense per day..... \$ 5.35
Cost to operate 45 miles per day at \$0.1392 per mile: Total cost to operate would be 6.26
Total cost to operate 45 miles per day..... 11.61
If the 3-ton truck is operated but 40 miles per day for 313 days per year, or total of 12,520 miles, the cost per mile..... \$ 0.069
Plus the tire, oil and gasoline cost per mile is..... .1462
Forty miles per day at \$0.1462 per mile equals, per day..... 5.848
Plus fixed expense, \$5.35, to operate 40 miles equals..... 11.198

Taking up the matter of the horse, the experts have the following to say:

We give herewith an estimated cost of operating horse-drawn vehicles; also schedule of first costs for such taken on a basis of an average horse of 1,400 pounds weight:

Team cost.....	\$ 550.00
Truck cost of 3 to 4-ton capacity.....	350.00
Harness.....	100.00
Blankets.....	12.00
Incidental costs for such a team.....	15.00

Team investment..... \$1,027.00
We believe from the best information we

Velie Statistician Shows Motor Vehicles Are Run More Cheaply, Service Considered

are able to receive that the life of an average team in a city, such as Chicago, where the pavements are hard, and this must be taken into consideration, is 5 years. The life of a lorry, or wagon, is 8 years; the life of harness is 4 years. We have endeavored to compute figures for cost of operation on this basis for weekly and daily expense. The average driver receives \$15 per week. We might state that many people carry an extra third horse to every ten as an investment for depreciation.

Cost per horse per week:

Feed, per horse.....	\$3.00
Veterinary and medicine.....	.08
Shoeing, setting and new shoes.....	.70
Horse depreciation.....	.86
Horse loss, one to twenty every 4 years.....	.07
Harness repairs.....	.12
New harness.....	.15
Storage or housing.....	1.25
Barn wage, which includes hauling of refuse, etc.....	.45
Grease for wagon, harness oil, etc.....	.12
Bedding.....	.10

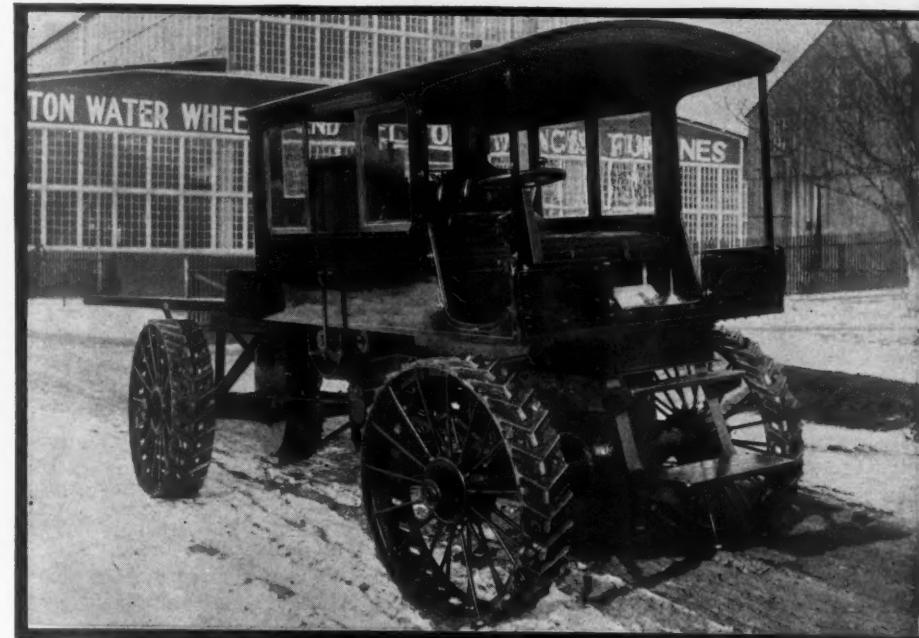
Insurance and liability protection.....	.24
Nets, blankets and barn blankets.....	.10
Wagon repair.....	.12
Repainting wagons.....	.12
Wagon depreciation, 10 years.....	.34
Interest on investment per horse at 6 per cent.....	.59

Total weekly cost per horse upkeep..... 8.41
On two horses, this same basis, the estimates would be twice as much..... \$16.82
Driver, \$15 per week, cost per week for team..... 31.82
Cost per day, 7 days..... 4.54
Average for teaming, 304 working days to the year.

A truck can be operated successfully to replace a given number of teams, and we estimate two and one-half teams. The expense of operating two and one-half teams per day, at \$4.54, per day, would be two and one-half times \$4.54, or per day, \$11.35.

The average team can travel 14 miles per day. Two and one-half times this would be 35 miles per day. The cost of operating the 3-ton truck is estimated \$11.61 per day. The cost of operating horse-drawn two and one-half teams, per day, estimate, \$11.35. A difference of 26 cents would be the cost of truck over two and one-half teams. One must consider under all conditions the cost of loading two and one-half teams compared with cost of one truck. Road and weather conditions must be taken into consideration, and the benefit from an advertising standpoint must also be considered.

Is Road Locomotive of Modern Design



FARM TRACTOR THAT IS DESIGNED FOR HEAVY WORK

THE Morton Motor Tractor Co., of Harrisburg, Pa., has brought out an immense tractor designed for road contractors, farming and heavy contract work. The invention was designed by Walter Morton, a member of the new company. The new tractor differs from other tractors that it has motive power on all four wheels, whereas the regular type is driven by the two rear wheels only. Adjustable chain-drive is another point of the new tractor. The chain is so constructed that the wear and stretch can be taken up so as to fit the sprocket wheel the same as when new. It has a 50-horsepower engine

of the four-cylinder T-head type, equipped with Bosch magneto and Stromberg carburetor. The engine is accessible from all parts, so it is not necessary to tear apart for adjustment, and is inclosed with a glass cab. The tractor has pulley attachment for operating other machinery, and having three speeds a farmer can plow his land, harrow and seed it, cut his grain with binder, thresh it and haul to market with train of wagons. The speed on the road varies from 2½ miles to 11 miles an hour. Open-faced wheels like on a pulverizer prevent the ground from packing—picking up the mud.



From the Four Winds



BIRTHDAY of A. A. A.—Last Monday was the tenth anniversary of the organization of the American Automobile Association.

Will Have Own Home—The permanent house committee and the executive committee of the York Motor Club, of York, Pa., have decided to purchase a building along the York and Wrightsville pike for use as a club house. A banquet of the club will be held at the Colonial Hotel, Friday evening, March 8.

Louisiana Using Gravel—Despite the fact that gravel has to be brought from Tennessee, gravel roads are being constructed at a number of points in Louisiana. The principal activity is in the vicinity of Shreveport and Baton Rouge. In the southern parishes of the state, shells are used instead of the gravel.

Canadians Start Road Work—Work on the King Edward highway between St. Lambert and Rouse's Point will be commenced next month, and the road is expected to be completed by the first of October next. In connection with the good roads movement in this province of Quebec, it is said that when the highway is completed between Montreal and New York, work on a second will be commenced connecting Montreal and Quebec via the south shore.

Beach Meet Announced—Frank Lowry, of Indianapolis, has been appointed chairman of the contest committee of the Old Orchard Automobile Association, which will run a beach meet at the Maine resort July 4, 5, 6. Old Orchard has 3 miles of racing beach. At low tide it is over 600 feet wide and as hard as rock. The program will be made up of sprints, middle distance and long distance contests. The Old Orchard Automobile Association will give approximately \$6,000 in prize money in addition to cups. The beach will be guarded by the Maine state militia and all races will be timed by an electrical instrument.

St. Paul Abandons Country Home—The Automobile Club of St. Paul will abandon its country club on Lake St. Croix, called the Anchorage, which has cost \$12,000 and which lost last season \$1,817. The distance from the city and consequent lack of patronage with indifference of road authorities to the demands for a better highway led to the decision in favor of a site at White Bear lake. Officers elected are: President, Judge E. W. Bazille; vice-presidents, J. L. Sullwold, C. P. Joy, E. L. Patterson; secretary, Henry Schadle; treasurer, W. B. Geery; trustees, C. Maxfield, C. W. Farnham, Dr. C. F. McNebbin. The club has 515 members, a net gain of seventy-one for the

year. George H. Woods and C. J. Gibbons reported they are preparing a Minnesota road book.

Subway at Speedway—Not only has the seating capacity been enlarged at the Indianapolis motor speedway, but other conveniences have been added, among them a subway under the paved track. Because hundreds of cars are expected to be parked in the interior of the 2½-mile course, a tunnel has been built under the track so that visitors may drive in and out regardless of the racing cars on the track. The overhead bridges will not be used while the race is in progress. The subway is made of concrete and is large enough to permit cars to enter and come out at the same time.

New Canadian Body—The Canadian National Automobile Association, of Toronto, without capital, has been incorporated for the purpose of uniting motorists in the dominion to secure reasonable, just and more uniform legislation to aid in proper enforcement of motor laws and ordinances, to advocate and obtain local, provincial and federal aid in age touring and to secure, prepare and the construction of good roads, to disseminate information relative thereto and to support sportsmanlike contests and other improvements that will advance motoring interests.

Wisconsin Registration—On March 1, only 8,337 motor cars had been registered in the office of the secretary of state of Wisconsin under the new law providing for the re-registration of all cars on January 1, 1912, at an increased fee of \$5 annually. This number does not include the 300 dealers who registered at the same rate. The secretary of state estimates that the 1912 registration will run up to 25,000, the figure being based on the total registration up to January 1. The estimated number of cars in Milwaukee is 3,750 and more than half of this number are now running and carrying the new license tags.

Twin Falls Election—At the annual meeting of the Twin Falls County Automobile Club, of Twin Falls, Idaho, officers for the ensuing year were elected as follows: President, Arthur L. Swim; vice-president, Arthur J. Peavey; secretary, Louis A. Burson; treasurer, Fred J. Spencer. These and M. J. Sweeley, L. L. Breckenridge and J. Benjamin Hall constitute the board of governors. During the past year the club has spent considerable money and donated a great deal of time to good roads work, and this will be continued the coming year. The movement started by the Twin Falls Commercial Club to build 30 miles of road

across the county in 1 day will be supported by the motor club, both with money and volunteer work by the members.

Milwaukee Places Oil Order—The department of public works at Milwaukee, Wis., has placed an order for 700,000 gallons of road oil for 1912 oiling work in the city. Last year 500,000 gallons were used.

Road School in Wisconsin—The first annual road school was held under auspices of the Wisconsin highway commission at Madison, Wis., from February 12 to 17. More than 200 county pathmasters, township officials and others directly interested in highway improvement under the new state aid law, were present during the five days' sessions.

Soldiers Praise Motor Cars—The Canadian parliament evinced exceptional curiosity as to the precise use to which Colonel Sam Hughes, minister of militia and defense, intended to put the dozen Ford touring cars for which the department recently gave an order. Interrogated in the house, Colonel Hughes replied that they were for the use of officers commanding and staff of divisions and districts for inspection of local armories, regiments and cadet organizations, "reducing the cost of those inspections and increasing the efficiency of the brigade."

Troubles of Pathfinders—Chester Lawrence, who was in charge of Pacific highway path-finding car from Los Angeles to City of Mexico, has returned to Los Angeles because of an attack of malaria, but the trip will be continued under the direction of T. J. Beaudet, who has driven the car the entire distance. Beaudet is now in the province of Jalisco and will be able to complete his trip within a few days, provided war conditions permit. This, however, has been true for the past week and it is decidedly uncertain as to just when it will be possible for this driver to continue to the Mexican capitol.

Studebaker Owners to Visit Canyon—Sixty Studebaker cars are entered in a sociability run to the Grand canyon and return, to be conducted early next June by the Arizona Motor Co., of Phoenix, Arizona, state agent for the Flanders and E-M-F. It is expected that between 100 and 125 cars will take part. J. M. Studebaker will meet the motorists at the canyon and preside over a banquet, to be given by the Studebaker company at El Tovar hotel. The Grand canyon is nearly 400 miles from Phoenix, but the roads are good most of the way. Three days will be consumed by the trip each way and 2 days will be spent at the canyon. Altogether the motorists will be out 9 days. Two big trucks, with a squad of

mechanics, gasoline, oil and a supply of extra parts, will be sent along by the Arizona Motor Co.

New Roads for Michigan—Thirteen miles of good roads will be built in Berrien county, Michigan, within the next few months at a cost of \$50,000. Macadam will be used in the improvement of nearly all the roads; only a few miles will be built of gravel.

Practical Work by Canadians—The minister of agriculture of Canada will start out eight lecturers on an educational campaign throughout the province of Quebec to persuade the municipalities to take steps in connection with the good roads movement, and to explain to the municipal council the terms of the proposed government assistance under the new Caron bill. It is hoped that the campaign will result in an early start being made towards improving communication between points in the province which are now isolated.

Three Mississippi Trunk Lines—A bill providing for three great trunk-line roads through Mississippi has been introduced into the state legislature. The three roads will radiate from Jackson, the capital, to different sections of the state. The bill specifies that the roads are to be modeled after the most improved plans to be submitted by the federal government. This measure is the result of the activity of owners of motor cars in Jackson. It is stated that during the greater part of the year motorists are limited to the city streets of Jackson due to the impassability of the roads in the rural districts.

Detroit After Engineers—Efforts are being made by the Detroit Convention Bureau, with the co-operation of the Board of Commerce, the Wolverine Automobile Club and influential citizens to bring the national good roads congress and the summer meeting of the Society of Automobile Engineers to Detroit this year. Invitations have been extended to both bodies and the bureau is anticipating a favorable reply in each instance. The Wolverine Automobile Club has offered to turn its rooms over to the engineers during the meeting.

Dealers Out to Boost for Roads—An association consisting of 150 dealers of three western states was formed in Sioux City, Ia., last week, known as the Iowa, South Dakota and Nebraska Automobile Dealers' Association. The headquarters are to be in Sioux City. The officers of the association are: H. B. Groves, Sioux City, president; H. M. Hessenius, Sioux Falls, S. D., vice-president of the South Dakota territory; Alfred Rhodes, Estherville, Ia., head of the Iowa territory; H. M. Scott, Plainview, Neb., head of the Nebraska territory; C. M. Wykoff, head of the Sioux City territory; H. A. Barr, Sioux City, secretary, and Lee Huff, Omaha, treasurer. The promotion of good roads is the chief aim of the new association.

Territorial meetings will be held frequently during the next few months and a big meeting will be held in Sioux City in the fall.

Chauffeur Has Perfect Examination—Knud Knudson, Delhi, Minn., is recorded in the office of the secretary of state of Minnesota as standing 100 per cent in an examination for chauffeur's license by the state examining commission. He is the first to make a perfect score.

Syracuse Club Holds Banquet—There were 400 guests, or nearly half the membership of the Automobile Club of Syracuse, in attendance at the annual dinner of the organization at the Onondaga Thursday night, the most successful in the club's history. James Schermerhorn, of Detroit, was the principal speaker of the evening. Others among the speakers were President Hurlbut W. Smith and C. A. Benjamin. Clever sign posting, containing the spirit of the banquet, was in evidence in the banquet hall.

Plan Entertainment for Tourists—Plans already are being made by New Orleans business men and motorists for the entertainment of the party making the A. A. A. reliability tour. Arrangements have been made for the raising of an entertainment fund. Banquets, motor boat rides on Lake Ponchartrain, an excursion up the Mississippi river on one of the big river steamers, a visit to the battlefield where Jackson defeated the British in 1814, are some of the points which have been decided upon as a part of the program.

Trying to Collect Wheel Tax—Strenuous efforts are being made by the assessor of Washington, D. C., to collect the wheel tax imposed by congress several years ago and which has been running through the courts ever since. Recently the court of appeals upheld the validity of the law and since then the assessor has been making plans for the collection of the tax. To date 235 motorists have paid the tax, the total revenue secured being \$1,001. So far there have been no prosecutions, as the motorists have invariably paid the tax as soon as served with a warrant. Arrangements have been made

with the judges in the police courts to fine delinquents double the amount of their tax.

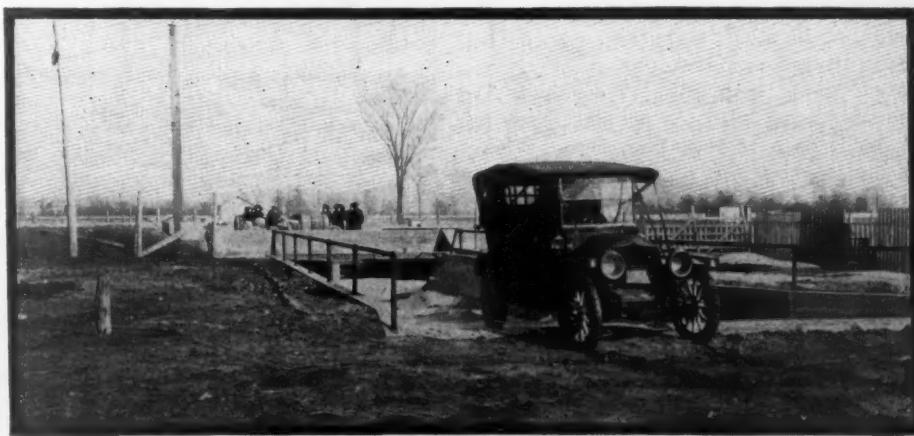
Club at Paducah—The Paducah Automobile Club, of Paducah, Ky., has organized with the following officers: President, J. R. Grogan; vice-president, F. E. Lack; secretary, Auber Smith; treasurer, Richard Rudy.

Road Department Created—The Quebec government has created a new department, and a new road department will be added to the department of agriculture under the jurisdiction of Hon. Mr. Caron.

Montreal Given Legislative Power—The private bills committee of the Canadian legislative assembly has accepted the clause of the Montreal city bill giving the city the right to prohibit the use of sirens and other distinctive motor alarms on the streets and reserving the employment of such devices to police, fire, ambulance and light and power companies' vehicles.

Bloomington Made Money—The recent show at Bloomington, Ill., under the auspices of the McLean County Automobile Club, was a great success financially, the total receipts from the door reaching \$1700. After paying all expenses, there was a slight balance, the dealers who agreed to pay space rental, if the receipts did not cover expenses, being able to exhibit their cars practically without cost.

Interested in Meridian Highway—The road from Winnipeg to Galveston, to be known as the Meridian highway, is receiving serious attention on the part of Galveston motor car owners. The activity has been prompted by a letter from the Watertown Automobile Club, of the South Dakota Association. It is requested that Galveston motorists notify the organizations in Texas which would be benefited by the proposed road and that immediate steps be taken to make the meridional highway a fact. Long stretches of graveled road already built can be used in portions of Texas and Oklahoma. A tour from Galveston north over the route is being suggested for the early spring.



NATIONAL EXITING FROM NEW SUBWAY BUILT UNDER INDIANAPOLIS SPEEDWAY



Current Motor Car Patents



1,018,412—Fluid-Actuated Clutch. Rudolph Diesel, Munich, Germany. Filed October 17, 1910. Serial No. 587,514.
1,018,428—Pneumatic Wheel Hub. Fred J. Koch, East St. Louis, Ill. Filed March 19, 1910. Serial No. 550,460.
1,018,447—Valve Mechanism. Peirce D. Schenck, Dayton, Ohio. Filed April 23, 1907. Serial No. 369,744.
1,018,454—Tire. Willard Irving Twombly, New York, assignor, by mesne assignments, to Twombly Motors Co., New York, a corporation of New York. Filed April 2, 1910. Serial No. 553,104.

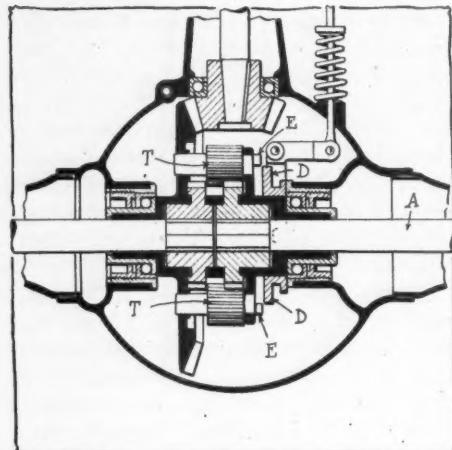


FIG. 1—CULLMAN DIFFERENTIAL LOCK

In which the disk D slides under the protruding half sections of the shafts E to which the gears T are secured, thus locking the differential and causing both of the driving shafts A to work as a unit.

P LEIN Carbureter—No. 1,018,776, dated February 27; to Louis Plein, Chicago.—The feature of this carburetor is the means of admitting auxiliary air into the fuel mixture of the carburetor, and of adding fuel vapor to this auxiliary air supply. As shown in Fig. 2, the carburetor comprises an annular float chamber C into which fuel is admitted at E. The primary air inlet is at the bottom of the carburetor the air entering as indicated by the arrows A. This primary air draws fuel from the spray nozzle N which is centrally located in the main air passage of the carburetor. As for the supplementary air supply, there is a series of cylindrical gravity operated valves V arranged in a circle concentric with the main air passage; these valves are graduated in weight, and cover openings A1 communicating with the annular recess R which is open to the atmosphere. When enough of a vacuum or partial vacuum is produced in the main air passage of the carburetor, these valves are lifted and admit more air. There is a felt filling F arranged in the top of the float chamber which is supposed to absorb fuel from the chamber and give off vapor into the recess R through the perforations P, to carburet the air passing into the auxiliary valves.

Kerr Carburetor—No. 1,018,766, dated February 27; to Harry E. Kerr, Detroit,

PATENTS ISSUED FEBRUARY 27, 1912

1,018,467—Motor Car Wheel. Alfred R. Wylie and James G. Wright, Big Spring, Tex. Filed October 11, 1909. Serial No. 522,121.
1,018,470—Fender for Motor Vehicles. William Young, South Bellmington, Wash. Filed April 28, 1911. Serial No. 623,994.
1,018,476—Clutch for Speed Regulators. Herbert L. Bostater, Chicago. Filed December 1, 1910. Serial No. 595,063. Renewed January 15, 1912. Serial No. 671,292.
1,018,481—Gas Engine. Herbert Cooper, Brooklyn, N. Y. Filed December 2, 1910. Serial No. 595,201.

1,018,498—Curtain for Vehicles. Frank H. Ilse, Chicago. Filed June 17, 1911. Serial No. 633,781.

1,018,504—Balanced Speedometer. Mathias J. Klein, New York, assignor of sixty-one-hundredths to Hugo B. Roelker, New York. Filed March 5, 1910. Serial No. 547,466.

1,018,532—Internal Combustion Engine. Willard Irving Twombly, New York, assignor to Twombly Motors Co., New York, a corporation of New York. Original application filed February 18, 1910. Serial No. 544,546. Divided and this application filed September 12, 1910. Serial No. 581,632.

1,018,535—Differential Gearing. Hugh L. Warner, Muncie, Ind. Filed September 25, 1909. Serial No. 519,506.

1,018,542—Supporting Device for Speedometer-Driving Mechanism. Rollin A. Bell, Boston, Mass. Filed March 9, 1910. Serial No. 548,226.

1,018,553—Differential Device. Otto Cullman, Chicago, Ill. Filed October 16, 1911. Serial No. 654,950.

1,018,590—Tire-Holder. Andreas M. Sonichsen, Milwaukee, Wis., assignor to Auto Parts Mfg. Co., a corporation of Wisconsin. Filed June 1, 1911. Serial No. 630,557.

1,018,591—Valve. Elmer A. Sperry, Cleveland, O. Filed February 21, 1895. Serial No. 539,298.

1,018,627—Vehicle Brake. John G. Miller, Burlington, Iowa. Filed January 16, 1911. Serial No. 603,017.

1,018,694—Roller Cage. George H. Carpenter, Philadelphia, Pa., assignor to Standard Roller Bearing Co., Philadelphia, Pa., a corporation of New Jersey. Filed August 30, 1911. Serial No. 646,816.

1,018,735—Resilient Tire. Frank Zimmerman, New York, assignor to Francis Keil & Son, New York. Filed May 12, 1911. Serial No. 626,746.

1,018,742—Internal Combustion Engine. Clarence A. Dawley, Plainfield, N. J. Filed September 3, 1908. Serial No. 451,563.

1,018,766—Carburetor. Harry E. Kerr, Detroit, Mich. Filed May 22, 1911. Serial No. 628,679.

1,018,772—Pneumatic Clutch-Controller. Walter D. Nickum and Martin Claussen, Los Angeles, Cal. Filed May 10, 1911. Serial No. 626,355.

1,018,776—Carburetor. Louis Plein, Chicago. Filed February 24, 1911. Serial No. 610,509.

1,018,814—Vehicle Tire. Henry H. Durr, Springfield, Ohio. Filed March 29, 1911. Serial No. 617,748.

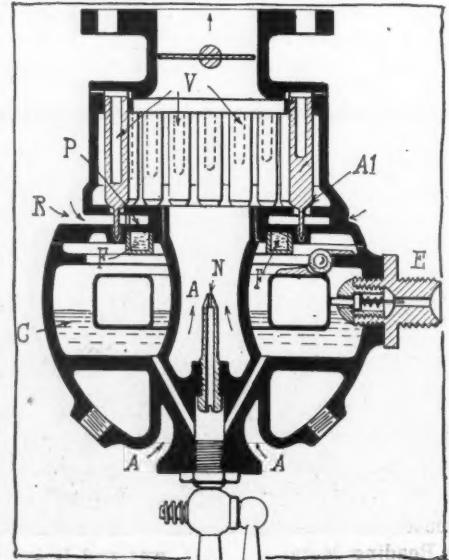


FIG. 2—THE PLEIN CARBURETER

1,018,953—Internal-Combustion Rotary Engine. William Barnes, San Francisco, Cal. Filed June 15, 1909. Serial No. 502,349.

1,018,969—Incandescent Gas and Like Burner. Julien Galile, Nancy, France. Filed November 30, 1907. Serial No. 404,487.

1,018,973—Wind Shield. John O. Hoffbauer, New York. Filed February 10, 1911. Serial No. 607,766.

1,019,007—Distance and Speed Meter. Mathias J. Klein, New York, assignor of sixty-one-hundredths to Hugo B. Roelker, New York. Filed October 29, 1910. Serial No. 589,723.

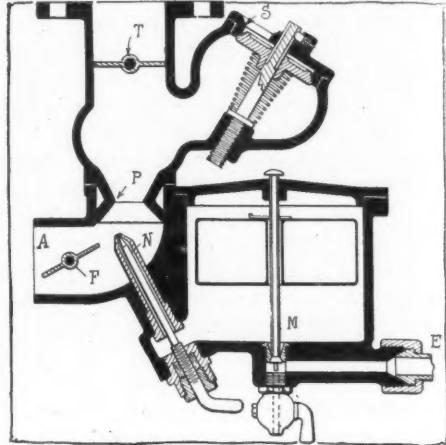


FIG. 3—THE KERR CARBURETER

In which fuel entering at E is controlled by the float valve M. There is an adjustable needle-valve in the spray-nozzle N, and the deflector F in the primary air passage is a feature of the design

Mich.—The Kerr carburetor, Fig. 3, is of conventional design. The fuel enters the carburetor at E, and the float maintains the required fuel level in the spray nozzle N. The primary air inlet is at A, and the air entering through it draws fuel from the nozzle N as it passes up through the carburetor. An auxiliary air-valve S is provided; there is a throttle valve T in the outlet passage; a deflector or choke valve F is fitted to control the proportion of air entering and passing the nozzle; and there is a means of locking the deflector in desired position. The arrangement of the deflector F in the air inlet opening, and the constricted portion, are features of the design.

Cullman Differential Lock—No. 1,018,553, dated February 27; to Otto Cullman, Chicago.—This patent relates to a spur gear differential design which is provided with a means of locking the differential mechanism. The object being to make it possible to make both of the shafts A move as a unit. As shown in Fig. 1, the mechanism resembles the conventional spur gear type of differential, except that the ends E of the pinion shafts T are projected, and cut away so that when the movable disk D is moved into these cut-away sections, the shafts S and their pinions cannot revolve. Thus the differential mechanism serves as a rigid connection between the two inner ends of the shafts A.



Legal Lights and Side Lights

FIGHT FOR UNIVERSAL LIGHTS

AT the instance of the Milwaukee Automobile Club an ordinance has been proposed in the common council of Milwaukee, Wis., requiring lamp or lamps to be displayed on every vehicle on any public highway, bridge or alley within the city limits, during the period from 1 hour after sunset to 1 hour before sunrise. The entire strength of 4,000 motorists in Milwaukee is being gathered by the motor club to force the passage of the measure, which undoubtedly will have strong opposition from teamsters. The original ordinance makes an exception of vehicles which carry as principle freight hay or straw, kerosene, gasoline or other like combustible or inflammable substances, but it is likely that no exception will be made and every vehicle be required to have lights. The light or lights must be so at-

tached that it is visible from front and rear.

The introduction of the ordinance was immediately followed by a movement on the part of teamsters to repeal an ordinance passed several months ago, which requires owners of vehicles left standing on streets or in alleys at night to be provided with lights. The movement is characterized as an attempt to draw attention from the real issue.

STIRRED BY STILWELL BILL

Motorists in New York state are aroused by the Stilwell bill, which has been introduced at Albany, which would compel them to adopt a new tail-light system which would mean an expense of \$2,500,000 in the state. The light idea, a patented one, shows vari-colored lights, according to the speed of the car. The obnoxious paragraph is as follows:

"Section 1. Subdivision 11a of section 1425 of the penal law is hereby amended to read as follows:

"11a. With intent so to do, damages in any manner a motor car or other motor-vehicle; or, 'who drives or uses a motor-vehicle on a public highway without said motor car or motor vehicle being provided with efficient brakes, and also with a suitable bell, horn or other signal and also a suitable signal upon the rear visible in the reverse direction when about to stop or slow down; and be it so constructed as to exhibit, during the period from 1 hour after sunset to 1 hour before sunrise, two lamps showing white lights visible within a reasonable distance in the direction toward which the vehicle is proceeding, also a red light visible in the reverse direction, when about to stop or slow down.'"

New York Decision Passes on Status of Foreign Corporations

Verdict in Body-Building Case of Interest to Motor Industry

suing is doing business in New York in contravention to the statute.

In the case in point, Jay N. Emley, attorney for Palmer-Singer, raised the question in his answer to the complaint filed by Roger Lewis on behalf of the Reading company.

Mr. Emley's answer, setting up a defense entirely separate and distinct from the original matters in suit, was as follows:

"As and for a second separate and distinct defense, defendant alleges upon information and belief that the plaintiff is a foreign stock corporation other than a moneyed corporation, doing business in the state of New York.

"Third—That the alleged contract sued on in this action was made within this state.

"Fourth—That plaintiff has not procured from the secretary of state a certificate that it has complied with the requirements of the law to authorize it to do business in this state.

"Fifth—That * * * plaintiff has not paid a license fee of $\frac{1}{2}$ per centum, or any license fee whatever."

On this showing the defendants demanded judgment.

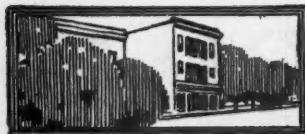
The trial occupied 5 days and was carried to extraordinary length by reason of the injection of this question into the dispute. The court finally held that while the Reading Metal Body Co. was and is a

foreign corporation, it had no money invested as such in New York. It carried no bank account within the state; paid rent for no office, salesroom or warehouse, and consequently did not come within the provision of the statute requiring registration.

It was shown in the trial that the officers of the complaining corporation were in the habit of soliciting business in New York either personally or by correspondence, and that the orders so secured were filled at the factory. One of these instances was proved as between the Palmer-Singer concern and the plaintiffs. The court did not file a memorandum opinion covering these conclusions, but each matter was raised in the trial, and the direction of a judgment bears upon each of them.

If, for example, the plaintiff had maintained a bank account, paid office rent and conducted a continuous business in New York within the purview of the statute, but without registration the court might have sustained the present suit on the simple point of law, because the statute places unregistered foreign corporations doing business in New York beyond the help of remedial law covering commercial claims.

As there are numerous instances of foreign corporations doing business within the state without registration which might be construed to be within the meaning of the statute in transacting business with individuals and corporations of New York residence, the defense of Mr. Emley takes on an added interest to the business world.



Among the Makers and Dealers



BUSY Making Clutches—The Merchant & Evans Co., of Philadelphia, is operating its plant on a full day and night schedule, making the Evans model of the Hele-Shaw clutch.

Poole Hupmobile's European Manager—John L. Poole has been engaged as European manager for the Hupmobile and will start early in April for Paris, where he will make his permanent headquarters at 11 Rue Scribe. E. G. Eager is the Hupmobile representative in Australasia, with headquarters in Auckland, New Zealand.

Plummer Re-elected—John F. Plummer, Locomobile Co. of America, again was chosen to head the Automobile Dealers' Association of New York at the recent meeting of the directors of that organization. Frank Eveland of A. G. Spalding & Brothers was elected vice-president, succeeding Sidney B. Bowman. C. P. Skinner was re-elected secretary and treasurer. The remainder of the board consists of the following: M. J. Budlong, R. D. Garden, H. M. Bronner, H. S. M. Mead, C. M. Brown, A. L. Newton and A. M. Day.

Heavy Foreign Shipments—Exceptionally numerous shipments of motor cars passed through the New Orleans port during February, according to the report of the dock commission. The greatest number of cars were consigned to Mexico City, 112 cars being billed from different points in the United States to the southern republic. Porto Rico was the destination of eighty-four cars. Guatemala was the recipient of fourteen cars, which were routed through this port. Other countries in Central America received several cars.

New Plant for Hupp-Yeats Electric—In order to care for the demand for Hupp-Yeats electric cars, it has been found necessary to provide much larger factory quarters and a deal has just been closed by the R-C-H Corporation, of Detroit, for a lease of the factory buildings on Monroe avenue, formerly occupied by Herbert Mfg. Co. Establishing the Hupp-Yeats in new and larger factory quarters will not only permit of a greatly increased output of electric cars, but the space gained at the R-C-H plant will enable the R-C-H Corporation to increase its output of gasoline cars over 50 per cent. At the present time the factory is turning out forty R-C-H cars per day. C. W. Fox has joined the Hupp-Yeats interests, as general manager in charge of the production of this car. Mr. Fox will devote a large part of his time to the manufacture of the Hupp-Yeats electric, but will still retain his interests in

the body-building business. There will be no change in the sales end of the Hupp-Yeats, and, as heretofore, this car will be sold through R-C-H Corporation branches and dealers.

Packard Dividend Declared—Directors of the Packard Motor Car Co. have declared the regular quarterly dividend of 1½ per cent on the preferred stock, payable March 15, to stockholders of record March 5. The transfer books will be closed March 6 to 15, inclusive.

Pratt Buys Joliet Plant—William E. Pratt, of the Pratt Mfg. Co., Joliet, Ill., has purchased the personal property of the bankrupt Economy Motor Car Co. of that city and has submitted a bid for the real estate which probably will be accepted if the real estate is secured. Mr. Pratt will operate the plant for the production of electric vehicles of the light delivery and roadster types. Owing to the unsettled matters regarding the plant the new managers will not make any definite statements.

Alco Uses Pullman Styles—Advanced ideas in motor car design are seen in the new Alco berline limousine which is distinguished like the other models by a white stripe about the body. One of the most conspicuous advances is the Pullman style of roof. It marks a breaking away from the type generally used in motor cars, thus serving as a relief to monotony of lines. The idea of utility is carried out by providing a row of small windows at either side. These furnish the system of ventilation and tend to eliminate drafts. An electric bulb, concealed beneath the tonneau door and thrown on automatically as the door is opened, serves to illuminate the step at night and is an assistance to passengers in entering or leaving the car. The end

to trouble from adjusting windows has been found in a patented regulator which supplants straps and holds the window fast at whatever height it is lowered.

Joins Studebaker Legal Staff—John F. Cotter, of Detroit, has been appointed assistant to Scott Brown, general counsel for the Studebaker Corporation, and will remove with his family to South Bend.

Fails to Find Profit—Peter S. Fleming has brought suit by capias in Detroit against Warren D. Clizbe and James C. Brown for \$5,000 damages. Plaintiff purchased stock in the Michigan Motor Truck Co., and he alleges that the business was not as profitable as it was represented. The defendants were taken into custody on the capias but were immediately released on bail.

Locomobile Branch in Baltimore—The Locomobile Co. of America has established a branch store in Baltimore. The company's location in the future will be at 107 West Mt. Royal avenue. In addition to the branch the company will conduct a service department in Baltimore. In announcing the necessity of establishing another southern branch the company says "this is a voluntary testimonial of the rapidly increasing sales in the south."

Des Moines Dealers Move—The prosperous and healthy condition of the motor business in Iowa is illustrated by the fact that during the last month four large Des Moines motor car companies are moving into new buildings which have been erected primarily for the motor business. The Iowa Auto and Supply Co., the Brown-Corley Motors Co., the Buick company and the local agents of the Cadillac all have moved into new quarters which give them greatly increased room and facilities. In addition to the four new buildings a number of other local dealers



ALCO BERLINE WITH PULLMAN STYLE OF ROOF



TESTERS FACE BLIZZARD IN HAVERS SIX

have taken new quarters which give them more space. The Means Auto Co. moved last week into the quarters vacated by the Buick company.

New Lozier Man—The Lozier Motor Co. announces the appointment of W. L. Davis to the position of eastern factory representative. Mr. Davis formerly was employed in a similar capacity by the Oldsmobile and Winton companies.

Henry Mitchell's Estate Appraised—The estate of Henry G. Mitchell, until his death on May 30, 1911, vice-president of the Mitchell-Lewis Motor Co., of Racine, Wis., has been appraised at \$400,000. It consists mainly of stock in the motor company. The court last week issued an order that the estate be immediately divided between the widow and the only daughter, Mrs. Stewart Webster.

Overland Activities—The Willys-Overland Co., of Toledo, has increased its working force several hundred in the past few weeks. A large amount of new automatic machinery is also being installed and numerous other improvements made which will result in larger production. All departments used in the making of bodies have been moved into the new five-story concrete addition which has just been completed. New machinery will be installed in the original plant where vacant

space was occasioned by the removal. The concern now has an output of about 100 cars a day.

Lozier Stock in Demand—There has been some demand for Lozier Motor Co. stock on the Detroit stock exchange. A bid on fifty shares was invited last week, the quotations standing at 70 bid and 73 asked.

Monson With E & J—Charles Monson, formerly western sales manager for Gray & Davis, has made a connection with the Edmonds & Jones Mfg. Co. and the Detroit Electric Appliance Co., in the capacity of general sales manager with headquarters at Detroit.

Doctor Has New Idea—Silas V. Dusseau, a former Detroit physician, who now lives in Erie, Mich., claims to have perfected a ball-bearing, frictionless drive for motor cars, eliminating skidding, releasing the strain from the back wheels, increasing the engine power and saving the wear on tires. The device consists of a ball and socket located in the hubs of the front wheels, by which the differentials in the two axles are connected to the transmission by an equalizer, allowing the wheels, in turning their different radii, to be propelled properly by the engine for the increase and decrease of resistance. The inventor has perfected the device with the assistance of F. X.

Dusseau and the Auto Parts Co. A company probably will be formed in Toledo for the purpose of marketing.

Fond du Lac Becomes Ambitious—Dealers at Fond du Lac, Wis., are organizing an association which expects to promote a show in the Coliseum after March 15.

Now Located in Detroit—The American Rim Co. has closed its New York offices and henceforth will be located in the Sun building in Detroit, Mich., handling all its business from that office.

Midland Has Chicago Man—A. H. Sackett, formerly of the Centaur Motor Co., of Chicago, has been made manager of the Chicago Midland branch, succeeding C. G. Wilson, who becomes sales manager of the Midland Motor Co.

Monitor Chooses Chicago Location—The Monitor Automobile Works, of Janesville, Wis., has moved its general sales and publicity department to Chicago, and from now on all business pertaining to sales and agencies will be conducted at 1421 Michigan avenue. J. E. Norling, secretary and treasurer, will manage the Chicago office and will have as sales manager F. W. Stewart, formerly with the Badger Motor Car Co.

Russell Stock Selling Well—The offer recently made by the Russell Motor Car Co., of Toronto, Ont., to its shareholders of \$400,000 of new preference convertible stock seems to have been popular. The shares have all been taken and although the total amount required on allotment was \$80,000 the company already has received \$285,000 in cash, a large proportion of the shareholders having taken advantage of their privilege to pay in full.

Burton Tweedy's Assistant—T. R. Burton, manager of the Pittsburgh branch of the United States Tire Co., has been appointed assistant to O. S. Tweedy, eastern district manager of this concern. Mr. Burton will move to New York. His successor in Pittsburgh will be C. C. Gehring, of Philadelphia. J. C. Weston, western district manager, has moved from San Francisco to Chicago to assume charge of the central district and C. A. Gilbert has gone from New York to San Francisco to take Mr. Weston's place.

MARCH

March—Show at Norfolk, Va.
March 2-9—Columbus, O., show; Columbus Automobile Club.

March 17—Track meet, San Jose, Cal.

March 23-30—Tent show at Indianapolis, Ind.; Indianapolis Automobile Trade Association.

BOSTON

March 2-9—Pleasure car show, Boston; C. I. Campbell, manager.

March 4-9—Show at Des Moines; C. G. Van Vilet, secretary, Des Moines, Ia.

March 4-9—Show at Reading, Pa.

March 4-9—Show at Newark, O.

March 5-6—Show, Madison, Wis.; Madison Automobile Dealers' Association.

LOUISVILLE

March 6-9—Advertisers' motor show, Tiffin, O.

Coming Motor Events

March 6-9—Fifth annual show at Louisville, Ky.; Louisville Automobile Dealers' Association.

March 11-16—Show at Cedar Rapids, Ia.; M. P. Beck, manager.

DENVER

March 12-16—Show at Syracuse, N. Y.; Syracuse Automobile Trade Association; Syracuse, N. Y.

March 12-16—Show at Denver; G. A. Wahlgren, manager, Denver, Colo.

March 17—Track meet, San Jose, Cal.

March 13-20—Show of Boston Commercial Motor Vehicle Dealers' Association, Mechanics' building, Boston; C. I. Campbell, manager.

March 25-30—Tent show at Indianapolis, Ind.; Indianapolis Automobile Trade Association.

May 14-17—Commercial reliability run Chicago Motor Club, Chicago, Ill.

May 30—Indianapolis speedway, 500-mile race, Indianapolis, Ind.

May 30—Track meet, Salem, N. H.

June 20—Algonquin hill-climb, Chicago Motor Club, Algonquin, Ill.

August 8-10—Galveston beach meet, Galveston, Tex.

September 2—Speedway race, Indianapolis, Ind.

October 7-11—Chicago Motor Club reliability run, Chicago.

Development Briefs

Accessories of Interest to the Motorist and Repairman—Unique Tire-Removing Tool—Safety Crank to Take the Place of the Ordinary One—Steel Tool and Battery Boxes—Reflectolite Metal Polish

THOSE who are so unfortunate as to need glasses while motoring, and who have found it anything but comfortable to wear them with the ordinary goggles, will be interested in the Autoglas, a neat, inconspicuous eye-protector, which combines the features of the goggle and the glasses to which the user is accustomed. The goggles resemble in appearance rather large spectacles with cushioned ear-pieces or temples. They are made to conform to the shape of the face to exclude the dust and wind and at the same time provide unobstructed vision. The patented feature is the hinged center piece which is claimed to give greater comfort. For further protection, the glasses are fitted with silk sides if desired and may be obtained either with or without the personal correction. These are marketed by F. A. Hardy & Co., Chicago, and are illustrated in Fig. 2.

New Carbon Remover

Accretions of carbon in the motor cylinder often are a source of trouble and their removal often presents difficulties to the amateur motorist. A fluid which may be injected into the cylinders for cleaning out the carbon has been put out under the name of Car-Bo-Lide. The ordinary method of using the decarbonizer is to pour two tablespoonfuls into each cylinder through the spark-plug holes. The spark plugs are then replaced and the motor allowed to stand 2 or 3 hours. This permits the liquid to dissolve the carbon and allow it to be blown out through the exhaust when the motor is started. It is manufactured by the Carbolid Chemical Co., Monrovia, Md. This is held to be much quicker than kerosene as a carbon remover, as the latter must stand over night.

Globe Steel Boxes

The manufacture of steel boxes for motor car use seems to have passed through the experimenting period and the period of numerous style innovations and to have settled down to standard sizes in which makers compete mainly on the basis of refinements of construction. The steel boxes of the Globe Machine & Stamping Co., of Cleveland, O., have been changed slightly in construction in the direction of improvement in appearance. Such refinements as electric welding of seams, the use of beads and pressed panels and finer locks and trimmings comprise the changes. Two of the latest items in this company's line are a new pressed steel running board and the pressed steel step

hangers. The new running board has a linoleum tread which is held in place by a heavy brass molding so arranged that it may be readily removed for renewing the treads.

S. B. R. Muffler Cutout

One of the objections to the installation of muffler cutouts after a car has been shipped from the factory is the amount of machine work usually required. In order to provide a cutout which may be applied easily and quickly without the removal of the exhaust pipe, the S. B. R. Specialty Co., East Orange, N. J., has produced the S. B. R. cutout. The installation consists of merely sawing a small piece from the under side of the exhaust pipe and clamping the cutout into position. It can be connected for either a foot pedal or a lever. It is designed to be not only a cutout but also act as a carbon catcher, for it contains a pocket in which most of the residue from the engine falls, which is finally forced out by the exhaust when the cutout is opened instead of going into and clogging the muffler. To prevent leakage the valve is made to open against exhaust pressure.

Vanometer Gasoline Gauge

As a guarantee against the trouble resulting from an unexpectedly empty gasoline tank the Van Auken Indicator Co., New York, is pushing a fuel tank indicator called the Vanometer. The indicator is attached to the dash and is of the fluid type, the level of a red fluid indicating the amount of gasoline in the tank. The device is never disturbed when going up or down hill and operates on fluid balance without any mechanism whatever. Special arrangements are provided for pressure tanks and the price of the devices for both gravity and pressure systems is exceedingly low. The arrangement is illustrated in Fig. 3.

Peck Spring Wheel

In Fig. 1 is illustrated one of the latest types of wheels designed to give resilience and at the same time permit the use of solid tires. This is the product of the Peck Spring Wheel Co., Chicago, Ill., and is designed chiefly for commercial service at present, although it is applied to passenger vehicles. The construction is clearly shown in the illustration in which one of the spokes is cut away to show the arrangement of the spring and plunger in it. It will be noticed that the spoke is pin-jointed at each end so that it may give in either direction as well as change its length under the various conditions of

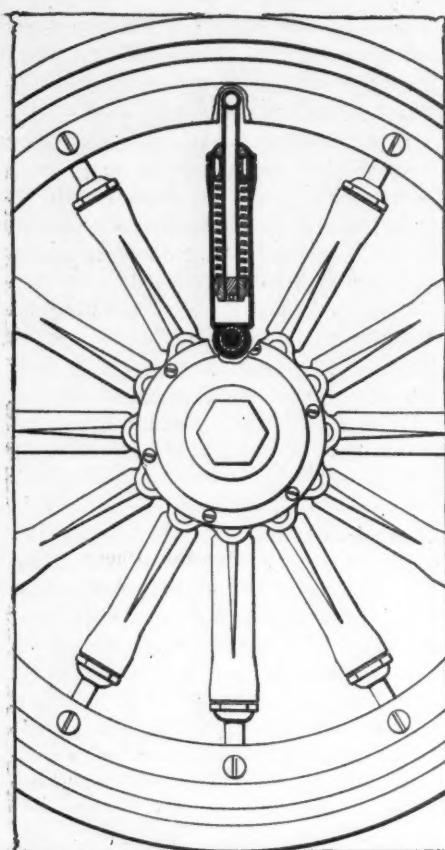


FIG. 1—PECK SPRING WHEEL WITH SPOKE CUT AWAY



FIG. 2—AUTOGLAS GOGGLES, SHOWING THE HINGED NOSE PIECE

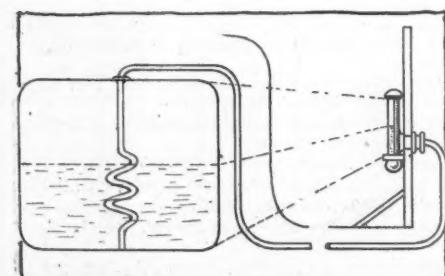


FIG. 3—VANOMETER GASOLINE GAUGE

Novelties for Motoring

Mechanical Engine-Starter—Compound for Mending Radiator Leaks—Spring-Repair Fixture—Combination Spectacle-Goggles—Fluid Gasoline Gauge—Spring Wheel to Replace the Pneumatic Tires

lead. The lower end of the spoke telescopes by the plunger working up and down inside the casing. The working part is thoroughly protected by a casing and by the adjustable end nut so it will not be affected by dirt or water.

National Motor Starter

Engine starters have been subject to amazing development during the past year, but there is one class of these devices that has not been given the attention in general that the other types have received. The several mechanical starters upon the market have been before the public for some time. Interest therefore attaches to the announcement of a new mechanical starter, called the National, the product of the National Gas Engine Starter Co., Chicago. It is unique in that although it is attached to the mainshaft there is no necessity of making any change in any part of the engine or transmission. A bevel gear is bolted around the shaft and this gear carries a toothed wheel or ratchet which engages a pawl. In mesh with the bevel gear on the shaft is another larger bevel gear on a short cross shaft. The latter is arranged to be revolved by pressing on a pedal. The revolution of the larger gear turns the shaft and thus the engine is turned over except in case of a backfire, when the ratchet throws the gears out of operation. The action is merely that of cranking the motor with foot pressure at the seat instead of by hand at the front, except that it is made easier by the gear reduction. The device is illustrated in Fig. 4. It is easy to attach and of low price.

O-Tak-A Tire Remover

For removing tires from detachable rims J. W. Grumiaux, Leroy, N. Y., is marketing the tire remover illustrated in Fig. 5. It can be applied to clincher tires the same as any quick detachable by the use of a special device to be fastened on the plunger of the tool. One movement of the handle is said to remove the tire.

German Radiator Compound

There is some objection to the use of compounds for mending radiators that necessitate pouring $\frac{1}{2}$ pint or more material into the radiator with the possibility of clogging the circulating system. The German Radiator Compound has been brought out to provide a substance for repairing small leaks in radiators so that a very little is required in the circulating system. This is the product of the Rie Nie Mfg. Co., Minneapolis, Minn. This

compound dissolves in the hot water of the radiator and solidifies when passing through a leak to the air. It builds up until a hard covering is formed which is said permanently to mend the radiator. The compound is claimed also to have properties which clean the circulating system and prevent the formation of scale or rust.

Boston Safety Crank

In Fig. 6 is illustrated the Boston safety crank with the cover removed to show the operating mechanism. This device is meant to replace the ordinary starting crank with one which prevents the back-kick of the motor being transmitted to the hand. It will be seen the principle of operation is the familiar ratchet-and-dog mechanism which allows the shaft to revolve harmlessly in case of a backfire. The crank is made and marketed by the Boston Safety Crank Co., Boston, Mass.

Reflectolite Metal Polish

The Narragansett Chemical Co., Providence, R. I., is making a liquid metal polish for brass and nickel work on motor cars, under the name of Reflectolite. It is claimed to have the qualities of rubbing up quickly to a clear deep lustre that retains its brilliancy, freedom from deposit in cracks or crevices or sediment in the cans, absence from grit, acid, alkali or ammonia to injure varnish on wood-work or the hands of the user.

Buckeye Spring-Repairer

For temporary repair of broken springs the Central Brass & Fixture Co., Springfield, O., has brought out a small iron brace which can be quickly adjusted to broken springs. It consists of a body made of malleable iron about 1 foot in length and U-shaped bolts of wrought iron; an under support of wood is also furnished which prevents slipping when the repairer is used for a spring which has been broken off-center or at the shackle. One end of the device is formed into a ring which will take a shackle bolt when the end of the spring has been broken entirely off. The method of repairing breaks in two positions is shown in Fig. 7.

Smooth-on Cement

A special cement for repairing cracked waterjackets, circulating pipes or leaking radiator tubes is manufactured by the S. B. R. Specialty Co., East Orange, N. J. Smooth-on expands and contracts the same as iron and is said to be not affected by heat, cold water or gasoline.

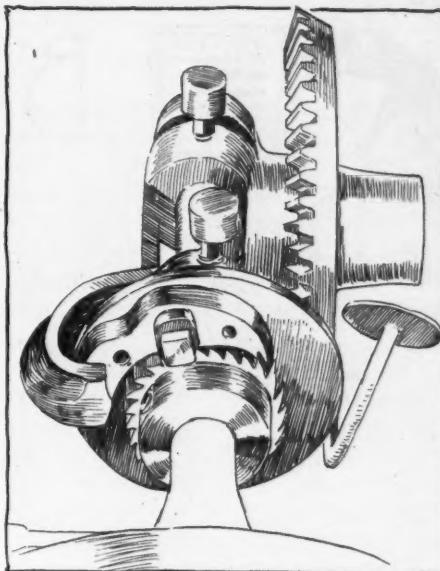


FIG. 4—THE NATIONAL MECHANICAL STARTER ATTACHED TO E-M-F

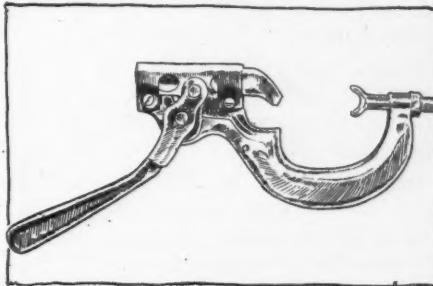


FIG. 5—O-TAK-A TIRE IRON



FIG. 6—INTERIOR OF BOSTON SAFETY CRANK

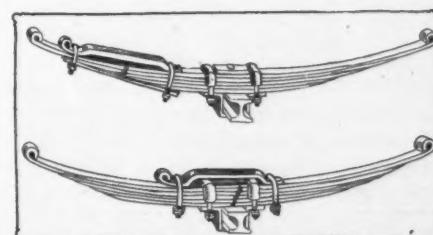


FIG. 7—BUCKEYE SPRING REPAIR



Brief Business Announcements

PEEBLES, O.—O. L. Bartlett has taken the local agency for the Ford.

Syracuse, N. Y.—T. A. Young has secured the local agency for the Maroon car.

Armington, Ill.—R. L. Kempf becomes the successor to Kampf & Markland, Cole representatives.

Laredo, Texas—L. Gonzales has opened a repair shop and garage at Iturbide and Salinas avenues.

Lake Mills, Wis.—The Lake Mills Automobile Co., recently organized, has been appointed local agent for the Buick.

Los Angeles, Cal.—The Greer-Robinson Co., Los Angeles, agent for the Mitchell, has let the contract for a new home to cost \$100,000.

Ottawa, Ont.—The Ontario Motor Car Co., of Toronto, has opened sales rooms here and is displaying Packards and Detroit electrics.

Washington, D. C.—The Wilson Co., agent for the Krit, has closed its salesroom at 912 Fourteenth street, N. W., and has retired from business.

Minneapolis, Minn.—The Midland Motor Car Co. has opened a branch in charge of A. P. Heaney, formerly of the Heaney Automobile Co.

Detroit, Mich.—E. W. Spencer, formerly general manager for Wheeler & Schebler, has been assigned to the Dallas, Texas, branch of the Studebaker Corporation.

Denver, Colo.—Frank P. Sevier, formerly of the Carstarphen Electric Co., of this city, has assumed the position of sales manager for the Colburn Automobile Co.

Washington, D. C.—David S. Hendrick, agent for the Thomas and Franklin, whose establishment was gutted by fire, has secured temporary quarters at 1319 H street, N. W.

Syracuse, N. Y.—The Willis Motor Car Co. has installed at its Montgomery street garage a repair and paint shop, requiring two floors above the garage and sales rooms.

Elkhart Lake, Wis.—J. A. Bruett, garage owner at Sheboygan, Wis., has opened a branch at Elkhart Lake under the management of H. Bruett. The Paige and Warren agencies will be held by both garages. Elkhart Lake is a well known summer resort.

Vancouver, B. C.—The Archibald Auto Co., Limited, has been organizing to carry on a general business for the sale, storage and repair of motor cars in Vancouver. A new fireproof garage has been built for them on Alberni street. The business is under the personal supervision of M. T. Archibald. It will handle the Haynes

and Warren-Detroit passenger cars and also the Atlas light delivery cars.

Montreal, Que.—Paul Lair has accepted the agency for Montreal of the Michigan car.

Columbus, O.—S. W. Scott, of Westerville, Ohio, has taken the central Ohio agency for the Courier.

Washington, D. C.—C. Cassard Schroth, who handles the Stearns, has taken quarters at 1608 Fourteenth street, N. W.

Des Moines, Ia.—The Buick Motor Co., which is the local branch of the Buick company, has just taken the agency for the Marquette cars.

Cincinnati, O.—Albert H. Lohrman and his brother, John F. Lohrman, have formed the Cole Motor Sales Co. to distribute the Cole in Cincinnati and surrounding territory.

Ottawa, Ont.—The officers of the newly formed Diamond Arrow Car Co. are: President, T. C. Bate; secretary, E. McMahon; managing director, T. Fleming; mechanical superintendent, L. G. Fainney; sales agent, Nelson Kerr.

Milwaukee, Wis.—Legnard Brothers, spark plugs, Merit tires and supplies, have moved their general offices from Chicago and Waukegan, Ill., to Milwaukee, where a branch has been maintained at 461 Broadway for about a year.

Indianapolis, Ind.—John A. Murphy, cashier of the Henderson Motor Sales Co., Indianapolis, has been placed in charge of the order department of this company. G. C. Hobson, late in charge of the promotion department, has been appointed cashier.

Philadelphia, Pa.—The Dahl Punctureless Tire Co., of Delaware, has opened headquarters at 1309 Race street for the distribution of the Dahl punctureless tire in Pennsylvania, Delaware, Maryland, Virginia, West Virginia and western New York, under the supervision of Jacob S. Buist.

Toledo, O.—The United Garage Co., of Toledo, has leased the double store building on Jefferson avenue, Toledo, adjoining its present garage and will double its present capacity for housing cars. The structure has a frontage of 50 feet, occupied by a two-story building, which will be utilized for storage purposes.

Milwaukee, Wis.—The Milwaukee Tire and Supply Co., 457 Milwaukee street, distributing Republic tires, has increased its capital stock from \$12,000 to \$20,000 to provide for extensions of the business. It is intended to put in a complete stock of supplies of all kinds in addition to general tire business. H. O. Stenzel is president; Philip Goers is vice-president

and treasurer and Albert Goers is secretary.

Lake Charles, La.—An E-M-F agency has been opened here. J. W. Price is in charge.

Plainview, Neb.—The Scott Automobile Co. has contracted to sell Franklins in this territory for the 1912 season.

Syracuse, N. Y.—The American Cole Motor Co., agent for the Cole and American, has moved into new salesrooms and garage at 215-217 James street.

Columbus, O.—The Rogers Supply and Tire Co., a corporation recently formed to deal in a full line of tires and accessories, has opened a store at 48 East Long street.

Boston, Mass.—J. W. Bowman, agent for the Stevens-Duryea cars, has taken on the Waverley electric for Boston and vicinity. He takes both the pleasure and commercial lines.

New Orleans, La.—A service depot is being stocked at the New Orleans branch of the Ford Motor Co. The selling agency has become a factory, practically, as nearly any part of the car can be duplicated without going out of the building.

Boston, Mass.—Harry F. Grant, twice winner of the Vanderbilt cup, has gone into business here, having taken on the agency for the Apperson formerly handled by the W. L. Russell Co. He has opened salesrooms at 1020 Boylston street.

Boston, Mass.—Chase Langmaid has resigned as manager of the Boston branch of the Auto Car Co. to handle the New England business of the Federal Rubber Co. in conjunction with Guy D. Niles, formerly with another tire company. Sales rooms have been opened at 261 Dartmouth street.

Milwaukee, Wis.—The Curtis Automobile Co., 142-144 Eighth street, representing the Reo and Corbin, has decided to devote all of its attention to the Reo in the future. This decision was reached before announcement was made of the discontinuance of the manufacture of the Corbin. The Curtis company's Reo territory includes the entire state of Wisconsin.

Detroit, Mich.—The King Motor Car Co., Detroit, has completed arrangements with the Prince Albert Motor Sales Co., of which H. H. Ittner is president, to handle the King line in Prince Albert and the surrounding Saskatchewan territory in Canada. Iverson & Johnson, of Kiron, Iowa, have taken on the King line. The Wasson Co., of Lincoln, Ill., will handle the King car in two counties in that state. Joseph E. Landry, of New Bedford, Mass., has taken the King line for the

extreme southeastern portion of Massachusetts.

Des Moines, Ia.—The Capital City Carriage Co. has added the Commerce truck to its line.

Akron, O.—The Portage Motor Car Co., of 35 South College street, has taken the agency for the Rambler for 1912.

Minneapolis, Minn.—The MacArthur-Zollars-Thompson Co. has signed the agency contract for the Woods electric, represented heretofore by another firm.

Minneapolis, Minn.—W. A. Peck, sales manager for the Midland Motor Car Co., has been in Minneapolis finishing the installation of a branch with A. P. Heaney as manager.

Columbus, O.—Leighton & Hancock, agents for the Sternberg motor trucks in Columbus, will open a new sales room at 39 East Town street. The territory covered by the agency covers eight counties in central Ohio.

Los Angeles, Cal.—The American Agencies, Ltd., 608 South Olive street, Los Angeles, acting as Pacific coast agent for eastern manufacturers, is making arrangements to open additional offices in San Francisco, Portland and Seattle.

Los Angeles, Cal.—H. S. Mason, for a long time representative of the Diamond Rubber Co. in Los Angeles, has left for Seattle, where he goes to take charge of the branch in that city. He will be succeeded in Los Angeles by A. J. Straney.

Boston, Mass.—Louis S. McCreary, for several years identified with the motor industry in Detroit, has taken over the New England agency for the Grabowsky truck and will make his headquarters in Boston. It formerly was a factory branch.

Columbus, O.—Harry E. Smith has purchased the stock of the Early Motor Car Co., which went into the hands of a receiver recently and will continue the business at the same location, South High street for sometime. He is expecting to move into a new location within a month. The stock consisted of parts, supplies and accessories only.

Kalamazoo, Mich.—Kalamazoo's newest garage is the Globe at 218-220 North Rose street. It was built and is managed by William Clark. This is a two-story brick building with modern garage equipment and will accommodate fifty machines on the first floor. Mr. Williams represents four makes of motor cars, the Chalmers, R. C. H., Nyberg and Hupp-Yeats electric.

Indianapolis, Ind.—New Cole agencies have been established by the Henderson Motor Sales Co., Indianapolis, as follows: Cole Motor Sales Co., Peebles Corner, Cincinnati, O.; William E. Bell, Little Rock, Ark.; Mt. Lebanon Auto and Repair Co., Mt. Lebanon, Pa.; R. B. Pierpont, North Haven, Conn.; Theo. Williams, 921 Worcester avenue, Canal Dover, O.; Crescent Garage Co., Ogdensburg, N. Y.; J. H.

Brown, Eveleth, Minn., and G. E. Sullivan, Oregon City, Ore.

Brandon, Man.—The R. C. H. has opened an agency here under the management of O. Muller.

Binghamton, N. Y.—The New York Sales Co., Cole agent, has moved into new quarters at 25 Washington street.

Minneapolis, Minn.—The Robertson Motor Co., 111 Tenth street S., has taken the northwestern agency for the Apperson.

Cumberland, Wis.—Peter Steineck, Jr., and Leroy Tuttle have rented the Cole garage and will reopen it at once. The firm is now negotiating for agencies.

Pontiac, Mich.—Articles of association have been filed with the county clerk by C. V. Taylor & Co. The company organizes, it is stated, for the providing of materials and the manufacture of tops and windshields. The capital stock is \$25,000, of which all is subscribed and paid in.

Montreal, Que.—The Regal Auto Corporation, of Montreal, has been formed to handle the Regal cars. The board consists of the following: M. E. Corbeau, president; M. J. Gooselin, vice-president; H. L. O'Donoughue, secretary-treasurer; O. Lapierre, C. A. Praiseault and E. Trudel, directors. The firm has opened show

Recent Incorporations

New York—Westfield Motor Truck Co., capital stock \$150,000; to manufacture motor vehicles; incorporators, A. D. Hamberg, C. A. Forshey.

Dover, Del.—Storm Motor Car Co., capital stock \$10,000; to manufacture and deal in motor cars and supplies.

Indianapolis, Ind.—Empire Automobile Co., capital stock \$100,000; directors, C. E. Gibson, C. B. Sommers, A. Waldheim, D. Sommers, D. May.

Detroit, Mich.—Wilkinson Motor Starter Co., capital stock \$50,000; incorporators, B. E. Brown and E. S. Brown.

Dayton, O.—Automobile and General Mutual Insurance Co., to specialize in motor car insurance.

Fayetteville, N. C.—Ramsaur Brothers Co., capital stock \$25,000; incorporators, Hubert Ramsaur, Allen Ramsaur and Carl Ramsaur.

Philippi, W. Va.—Philippi Auto and Supply Co., capital stock \$10,000; general motor car business; incorporators, R. Stainaker, J. W. Byrer, B. M. Wilson, J. H. Yeager and H. H. Byrer.

Chicago.—Rosen Teaming Co., capital stock \$2,500; teaming and transfer; incorporators, J. H. Jaffe, F. E. Greenberg, E. M. Tinnefeld.

Springfield, Ill.—Springfield Auto Sales Co., capital stock \$35,000; to deal in motor cars and accessories; incorporators, V. W. Ogg, F. T. Keisacker, L. S. Winegar and R. A. Trumbull.

St. Louis, Mo.—Victor Buggy and Auto Top Co., capital stock \$2,000; incorporators, F. Roband, R. E. Perdue and O. E. Carter.

Louisville, Ky.—Louisville Carriage and Taxicab Co., capital stock \$200,000; incorporators, J. E. Roache, G. E. Roache, L. K. Delpj and W. R. Bingham.

Elkins, W. Va.—Elkins Automobile Supply Co., capital stock \$5,000; to repair motor cars and operate garage; incorporators, T. Donohoe, G. W. Adamson, E. O. King, E. D. Talbott, W. C. Poston, S. B. Hoffner and S. O. Billings.

Montgomery, Ala.—Standard Auto Supply Co., capital stock \$25,000; incorporators, J. F. Stephens, W. E. Dark and L. D. Stephens.

Pontiac, Mich.—C. V. Taylor & Co., capital stock \$25,000; to manufacture motor car tops and windshields; incorporator, C. V. Taylor.

Kansas City, Mo.—Baker Electric Co., capital stock \$55,000; incorporators, A. J. Pray, R. C. Norton, J. D. Norton and others.

rooms and offices at 10 St. Lawrence boulevard.

Mowrystown, O.—Miller & Saunders have taken the local agency for the Ford cars.

Montreal, Que.—The Royal Automobile Co. has taken on the local representation of the Lion.

Topeka, Kan.—Stahl & Stone, Cole agents, have moved into new quarters at 621 Quincy street.

New Windsor, Md.—W. Edward Baker has secured the dealership for the Franklin in Carroll county for the present year.

Buffalo, N. Y.—The Zimmer Motor Vehicle Co., 803 Main street, has opened an agency here for the sale of Imperial cars.

Columbus, O.—The Adamson Auto Co., 35 West Mound street, has taken the central Ohio agency for the Briggs-Detroiter.

Santa Ana, Cal.—The Vance-Wanavan Motor Co., of Los Angeles, has closed an agency with the Libby Garage of Santa Ana, for the Cartercar.

Crandon, Wis.—F. J. Rogers, of Nashville, Wis., has taken the agency for the Ford and opened a garage in this place. It will be managed by Leslie Carter.

Cincinnati, O.—Charles Schuster, sales manager for the Cadillac in Cincinnati, has resigned to accept a similar position with the Cole Motor Sales Co., Cincinnati.

Columbus, O.—The Brewer Auto Sales Co. has been formed to take the central Ohio agency for the Lion. The salesroom is located at 28-30 West Spruce street.

Columbus, O.—B. B. Harris and R. W. Llewellyn have been placed in charge of the Columbus branch of the Republic Tire and Rubber Co., located at 215 North Fourth street.

Philadelphia, Pa.—The E. C. Johnson Co., northwest corner of Broad and Spring Garden streets, local agent for the Reo and the American cars, has added the Premier to the list.

Detroit, Mich.—G. R. Moran, formerly chief engineer in Detroit for the New Departure Mfg. Co., has joined the engineering force of the Collins Axle Mfg. Co., of Pittsburgh, Pa., with headquarters in Detroit.

Syracuse, N. Y.—Bradley J. Lane has purchased from Otto Johnson his interest in the Syracuse Regal Co., at 1205 West Genesee street, and with W. F. O'Connor will conduct the business under the same firm name as now.

Denver, Colo.—The Overland Auto Co., of Denver, the branch in charge of Colorado business, has appointed as Overland agent in Fort Morgan F. A. Croft. At Sterling, Colo., the Ideal Garage and Machine Works will handle the Overland.

The Brush car, which is also handled by the Overland branch here, is being assigned to various dealers throughout this territory. The Unfug Hardware Co., of Walsenburg, is a recent appointment for the Brush.



The Motor Car Repair Shop

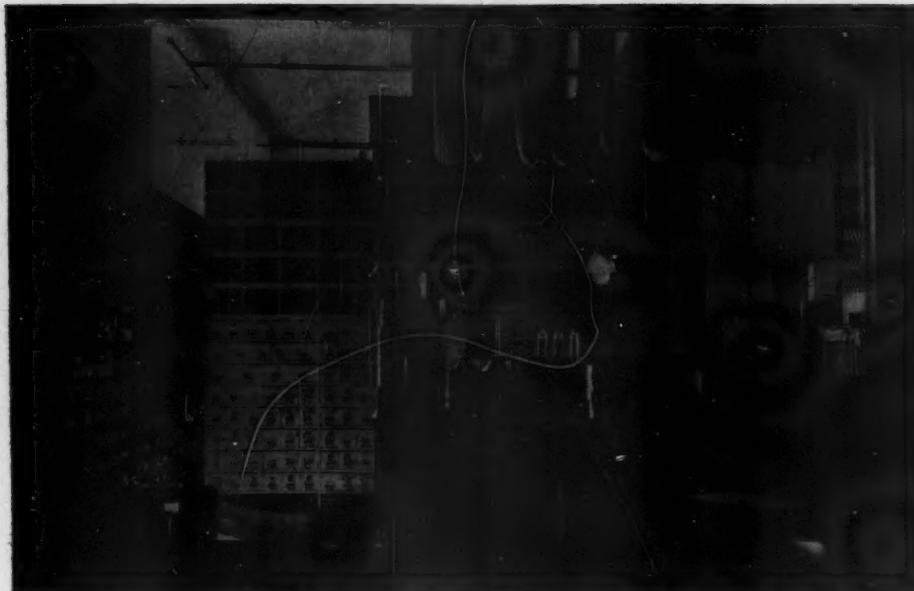


FIG. 1—A PEEP OVER THE COUNTER INTO STOCK ROOM OF THE PEERLESS AGENCY

INASMUCH as the supply departments, stock rooms and repair shops are very closely related in most of the motor car agencies, the illustrations shown in Fig. 1 may serve to aid many of the dealers throughout the country in arriving at a systematic arrangement for their old stock and supply departments. The illustration represents a section of the supply department of the Peerless branch, Chicago, looking over the shelf which separates the supply or stock room, from the public. The illustration is practically self-explanatory. At the bottom of the illustration and on the shelf at the right is shown a purchase slip machine on which a triplicate record is made of everything that is sold to chauffeurs and motorists who obtain supplies from the department. At the left on the same shelf are samples of the various oils carried in the stock. In a rack on the left are drawers for nuts, bolts and washers, and such small articles frequently required by the motorist; whilst above the drawers on shelves and tills, other articles of a similar nature are kept. Directly behind the shelf and toward the right is a large rack with shelves and tills, upon which oils in cans, inner tubes, various tools and articles for tire and motor car repair equipment are kept in an orderly manner, and in plain sight that encourages the motorist to buy. By thus arranging things in plain sight the motorist is reminded of the things that he wants and sales are stimulated. The tires which are shown suspended from above are not in storage; these are simply samples of the various makes and designs carried in stock. The larger parts and the smaller ones, which are less often demanded by the motorist or chauffeur,

but more often required by the workmen in the repair shop, are kept in an orderly fashion in the larger tills and drawers, shown in the background.

Stevens-Duryea Repairshop

The Stevens-Duryea branch in Chicago has in its repair department perhaps one of the most complete sets of machine tool equipment to be found in any of the similar shops in Chicago. An idea of the completeness of the equipment in this shop

may be obtained from a glance at Fig. 2. At the left and in the foreground of this illustration is shown a large power-driven steel saw S which is considered almost invaluable by the workman. Behind this at M is a milling machine; while behind it at G is a universal grinder, which is employed extensively in grinding tools, reseating valves and performing other operations of that nature.

Centrally located in the background is a large drill press P, and to the right of it farther back near the fencing is a two-cylinder air-compressor which keeps a supply of compressed air in a large tank T. Prominently situated on the right is shown a shaper R and between the shaper and the air tank T is a large 20-inch lathe. At the extreme right in the illustration there is another lathe L, this one being a 16-inch size. Along the wall against which the photographer stood when the photograph was taken, there is at the right, near the 16-inch lathe L, a small speed lathe which is found extremely useful in many of the operations for which the larger lathes are cumbersome. At the left of this is a small high-speed drill press and to the left of the small drill press in the corner is the forge. As the illustration shows, the machine tool department is fenced off from the rest of the shop so that when the workmen are employed at the machine tools they are free from the annoyances of owners or chauffeurs whose cars are undergoing repairs.



FIG. 2—A VIEW OF STEVENS-DURYEA REPAIRSHOP, CHICAGO